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ABSTRACT

This volume evaluates the effects of contemporary issues and technological trends upon the nature of Western society's educational systems and its ability to cope with changes in employment. The work is a translation from Italian. Three chapters emphasize higher education and compulsory education's relationship to a future society of quality living. Chapter 1, "The Quality of the Future," describes employment and new technologies, industrial restructuring, and the readaptation necessary of the labor force. A model case of technological reconversion in an Italian firm is analyzed, which resulted in extensive lay-offs. Conclusions include the point that the public sector does not offer retraining opportunities, which plays an important role in the turnover phenomenon. "The Near Future of Employment," chapter 2, applies economic and projective theories to employment in the United States and Europe. Scenarios for Italy and the United States illustrate the projected growth of occupations in lower echelons and at the top, resulting in a blue and white "striped collar" phenomenon. The teaching profession reflects a need for knowledge of computer systems in all fields. Greater availability of total wealth along with growing social imbalances will return attention to equality of opportunity. Chapter 3, "What Should Be Done about the Future?" suggests that answers must be sought within educational research, and yet the results of such research have not been utilized to improve society as a whole. In speculating whether the school system is capable of satisfying future occupational needs, educators should consider a uniform postcompulsory education system to deter unemployment. Eventually, everyone must be guaranteed minimal knowledge to respond to the challenge of "new literacy." References accompany each chapter; 21 tables of projective data are appended. (CJH)

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The Next 6000 Days:
A Perspective on Employment and Education for the 21st Century

Saverio Avveduto

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Foreword

The Next 6000 Days presents an English language translation of Professor Saverio Avveduto's timely and thorough analysis of contemporary issues in higher education. The author, a high ranking government official in the Italian Ministry of Education with vast international experience, provides a searching probe into the contemporary economic, political and educational conditions of Europe and the United States. The search is for a rationale and a conceptual structure to guide educational planners, lawmakers and researchers as they work toward the design of educational provisions for the 21st century.

Dr. Avveduto brings to this task a thorough grounding in research and a competent grasp of economic and educational trends. He dutifully disclaims having any specific vision of the future but then proceeds to enlighten the reader about a future that springs from the context of prevailing and developing social conditions.

Avveduto deftly balances the various social, economic and historical pressures on education and strives, successfully, to produce a vision for higher education which will be able to cope with the "new illiteracies" spawned by the increasing social need for complex technologies and services.

The International Council on Education for Teaching (ICET) is pleased to serve as publisher of this volume because of the contribution it makes to planning for our global future. We are at a point in history where mankind is beginning to develop a common history and is fated to share a common destiny. The development of higher education in *The Next 6000 Days* will require that each nation approach this task with a vigorous emphasis on economic change and international competitiveness without sacrificing the needs for general education for an informed citizenship.

ICET is indebted to Dr. Roberto Severino for his accomplishments as translator and consultant and to Ms. Trudy James and Ms. A. Minato Amelang for bringing this project to fruition. ICET extends to Professor Avveduto its appreciation for this contribution to educational research and the building of our common future.

Frank H. Klassen
Executive Director, ICET

Preface

Only 6,000 more days and we will be ushered into the twenty-first century. Yet the future of the utopians as well as that of the sociologists or the economists is clouded with uncertainty. The very factors projecting future models are, at best, to be extrapolated from data covering past and rapidly changing current trends in the growth of population, in economic activity or in the development of technologies, and are thus subject to meaningful variables.

The great myth of only thirty years ago of a world industrial society based on capital seems now to have been replaced by an information society based on knowledge. With this shift, however, new society's attitudes towards working and income alternatives have also arisen. Undoubtedly various factors such as demographic changes, increased life expectancy, the trend toward economic and technological globalization, and the robotization and automatization of productive processes, will play a growing role in the future and will affect the quality of our lives in a very significant way.

The extremely delicate balance between educational formative processes and labor projections must not, however, fail to take into account the much probable reorientation towards a supply side economy, as it cannot afford to ignore the equally important social and societal expectations of man in a post-industrial society.

If we are to accept the widely shared assumption that by the year 2000 the working population will be better educated, a prerequisite essential for a more equitable redistribution of wealth, it may be equally true that education in itself, although indispensable for a successful career, will not assure anyone of social satisfaction or financial rewards. It may be, indeed, as we are often reminded, that advanced degrees for which there will be little or no demand will remain largely unutilized and that, in any case, the new technological environment will make it impossible, but for a very few, to achieve a decision-making occupational level.

It is once more up to the intellectuals and the educators to take the lead and to probe the future holistically and humanistically in order to foresee the problems that lie ahead of us in the world of tomorrow, and, ultimately, to suggest the proper direction that our society and our educational systems ought to take. There exist, naturally, the perils of choice as dramatic changes can and should be expected, but an education system in a progressive society cannot afford to stand still waiting for things to happen.

Roberto Severino
Georgetown University

Chapter I

The Quality of the Future

1.1. The "Soft Levers"

As a general introduction I want to emphasize that my purpose in this volume is not a simple exercise in social forecasting. Experience during the last two decades reveals such efforts as futile for the most part. Society is, after all, the result of an enormous number of day-by-day transactions, linked often to the irrationality of feelings rather than the rationality of reason.

Considering the increasing complexity and autonomy of our various societies, my first-assumption is that societal intervention is possible only through the use of what I term, "soft levers." The governance and redirection of our societies is possible only through the use of gentle persuasion and delicate suggestion. Among the most important of these soft levers are the combined effects of education, educational research and the "tertiarization" of society. By tertiarization I mean the application of a scientific method and attitude to the resolution of human problems and the application of an industrial way of organizing the production of goods for the whole social system.

We are entering a phase that might be called "cultural pendularism." In a mere 30 years we have shifted from the great myth of economic development to an economic crisis; from the protests born of widespread, but unequally distributed economic prosperity to an acceptance of the status quo; from an infatuation with science to the rebirth of religiosity; and from the ambition to rigorously dominate social change to a resigned acceptance of daily events as they occur.

Within these extremes and contrasting attitudes it is possible, however, to speculate on several possible future scenarios and to identify optimal goals, as well as some plausible means to reach them. The following pages are a first step in that direction.

1.2. Peccei's "Missions"[1]

Aurelio Peccei, Italy's most illustrious futurist, dictated an unfinished document during the last days of his life in which he proposed a likely scenario of the evolution of our planet until the year 2000. The strong visionary character of Peccei's work is underscored by its very incompleteness, which gives it an aura of open discourse, akin to Plato's dialogues or to an "unfinished" novel as written by Bellow.

Taking into account the data concerning exponential demographic growth, the increasingly strained relationship between man and his environment, the growing expansion of human society which is destined to become a "highly interwoven system," and the correct use of new technology (including that of the arms industry), Peccei identified five "key missions":

- human settlements;
- environmental conservation;
- monitoring of the system;
- human development; and
- a nonviolent society.

1.3. The Quality of the Development and Education

As far as the highly industrialized nations are concerned, such as those belonging to the Council of Europe and the Organization for Economic Cooperation and Development (OECD), these missions, despite their encompassing nature and interdependence, have a particular importance with regard to national development and education in all societies.

The subject of "quality" has become popular since Mr. Bell, former Secretary of Education under President Reagan, released the report, *A Nation at Risk*[2], in early 1983. It was later discussed at a special OECD Conference held in Washington, D.C. in June, 1984.

Beyond the direct emotions and the reverberations caused by Bell's report, all industrial nations have since appraised the soundness of their educational systems. Following an initial examination, one of the focal points at issue was, both from a political and scientific standpoint, how to measure "quality." This point was discussed by the OECD Education Ministers at a Paris conference in November, 1984. On that occasion they discussed the following four points:

- how to assure continuity and innovation in an educational system;
- how to correlate general and specialized education using interdisciplinary approaches;
- how to combine mass education with excellence; and
- how to obtain an equilibrium between uniformity and diversity in the educational institutions. The traditional concern of quality versus quantity emerged again as inseparable issues.

1.4. The Tertiary Sector: The Product is the Process

The structure and conditions of employment always provide a challenge to educational systems. This is especially true under current economic conditions which exhibit an increasing tendency toward "tertiarization," that is, the rapid growth of the service sector, and what in the 1960s was known as "highly qualified manpower." In the 1960s these were primarily highly trained engineers and technicians which have been replaced today by managerial manpower in the economy and in society.

Today the tertiary sector (services) dominates the secondary (industry) and primary (agriculture) sectors within the working population.

Italy, for instance, reached this level of maturation for the first time in 1982, when the employment structure consisted of the following: 2.5 million employed in agriculture, 7.5 million in industry, and 10.5 million in services. This trend continues, and in 1984 out of 20.7 million workers, 6.9 million (33 percent) were employed in industry, 2.4 million (11.8 percent) in agriculture, and 11.4 million (54.9 percent) in the service sector. In Italy, employment in the service sector has surpassed that of industry since 1974 and continues unabated (see table 1). (All tables mentioned hereafter appear at the end of this publication.)

The United States had achieved a comparable situation in the preceding decades, thus illustrating the difference, albeit temporary, between the two economies.

A realistic understanding of the consistency and quality of management is provided by the available cadre of researchers existing in the major industrial countries.

On the basis of available data for the 13 OECD member countries representing 85 percent of the area of OECD, there were an estimated 1.7 million active researchers in 1981. It is interesting to note that this represents an average annual increase of three percent from 1969 to 1981 and of 4.6 percent from 1979 to 1981. This average increase actually conceals strong imbalances, 41.3 percent of the researchers of the entire OECD are found in the United States alone. Japan and Germany follow with 23.7 percent and 7.7 percent respectively. Italy is sixth with 3.1 percent.

By observing the comparative rate of average annual increases, the emergence of other elements can be noticed. In the period 1969-1981, the rate of increase in the United States was only 1.8 percent, but rose to 3.7 percent. Among the countries whose number of researchers has greatly increased, we find Italy with 6.2 percent between 1969 and 1981, second only to Norway (7.9 percent) and Sweden (6.9 percent). Evidently, Italy's figure is exaggerated due to the often indiscriminate and peculiarly Italian method of labeling as "researchers" even those university scholarship holders chosen at random. Equally interesting is

the data concerning the "presence" of researchers within the labor force. They allow (OECD research 1984) for an international comparison on a per thousand base unit.

The historical trend between 1973-81 shows significant variations (see table 2) for Japan and West Germany, from 4.5 to 6.9 and from 3.4 to 4.7 respectively. Italy, from 1973 to 1981, saw an increase from 1.7 to 2.3 researchers per thousand units of work force, certainly not a substantial growth considering their poor quality.

Currently, the tertiarization phase is often associated with the decline of the product cycle. When any commodity approaches market saturation, the system is pushed strongly toward innovation. The emphasis shifts from the product to the process and to the mode of production.

This change, typified in the communications industry by the phrase, "the medium is the message," has been superseded in economic circles by the equation, "the product is the process." In the field of education these changes may be described as the methods of education having become equated with the skills obtained in the process of human development.

Furthermore, large production firms today tend to acquire large distribution channels as a precaution against bottlenecks. This leads eventually to a merging of the production and distribution phases in industry. This growing unity of product and process is clearly viable as a growing phenomenon in education as well, where the product, or the consumer of education (the learner), is seen as an essential component of the production or teaching process.

Upon further analysis, however, this growth of the services sector, considered typical of economically developed countries, may eventually prove to be more apparent than real. The "decline of industry" may be illusory if further analysis showed that the agriculture and services sector were, indeed, becoming more industrialized. Industrialization, in terms of organization and production systems as well as technical facilities, is now spreading to all economic sectors.

As computer science networks become the supporting structure of the entire economy, the industrialization of the agriculture and service sectors grows.

The first "factory without workers" has already been planned and financed by the Japanese Ministry of Foreign Trade. Its prototype is now being tested and it is anticipated to be functional by 1989. Consequently, the global scale of values is readjusting. The United States and Japan are racing to become the First World--the class "A" of the so-called Northern part of the world. Europe will slip to second place; the Advanced Arab Nations will take third place: third world countries will slip to fourth and the remaining disinherited nations to fifth. Leontieff's analysis, conducted for the United Nations in 1977 and relative to the global scenarios in 1990 and 2000, approximates these figures.[3] A sure and alarming sign of the United States and Japan

breaking away is their program of a "biosociety" that goes beyond the information society (the coming 20 years) and extends to the year 2005, thus clearly bypassing the Old World. First and second world countries still possess, however, a few common characteristics: average working population, employment and unemployment, gross national product and education costs, even though internal differences persist (see table A).

1.5. The Employment Situation in the United States and the European Economic Community (EEC)

According to the Bank of Italy's *Economic Bulletin* (1984), the levels of employment in the United States and the EEC show divergent trends during the preceding decade. From 1973 to 1983, 13 million new jobs were created in the United States while the EEC showed a loss of three million jobs. At the same time, the United States labor force grew at an annual rate of 2.2 percent and only .5 percent in the EEC. By 1983 this growth had contributed to the unemployment of 6.5 million people in the United States and nine million in the EEC. These differences cannot be accounted for by differences in the growth of income in the two regions, which were negligible. Income growth averaged 2 percent in the United States and 1.7 percent in the EEC.

An analysis of employment patterns in all economic sectors also illustrates differences between the United States and the EEC. During the 1973-1981 period, the EEC experienced a decline of two million people in the agricultural sector, while in the United States it remained relatively unchanged, pointing to the different levels of agricultural development in the two areas. In the industrial sector the United States absorbed one million new workers while European industry showed a loss of five million workers. In manufacturing alone the EEC reduced employment by four million workers while the United States registered a slight increase.

Finally, in the service or tertiary sector, the United States absorbed 12 million people as against six million in the EEC. Because of overall lower employment in this sector in EEC countries, the degree of tertiarization has grown at a faster rate.

Those employed in services were 50.5 percent of the total in 1973, and 56.5 percent in 1981; in the United States this percentage has grown from 65.6 percent in 1973 to 69.2 percent in 1981. It must be pointed out that the process of tertiary sector growth in the two areas has different characteristics. In Europe the public sector was a determining factor in the creation of new jobs. Distinguishing within the tertiary sector, services salable by other services, over 85 percent of the increase in United States employment was concentrated in that area, while in Europe only 60 percent of the increase went into this area.

These differences in the growth of the tertiary sector in Europe and in the United States could have significant effects on the efficiency of the two economic systems.

The favorable employment dynamics of the United States are the result of other factors, among which is the necessity to substitute production factors that have become relatively more expensive than labor, and that of satisfying a growing demand for services, especially those of a highly professional nature. Such tendencies have been favored in the United States by a moderation in salaries that has affected both the manufacturing and the service sectors. The relationship between cost of labor per worker in real terms (calculated by deflating the per capita income with the implicit price index of the value added by the sector) and productivity (real wage-gap), which constitutes a synthetic indicator of allocations of income distributed to labor, shows that in both the manufacturing and service sectors the increases in the United States are considerably lower than those of the EEC (see table 3).

The note concludes that such outcomes are the result of wage increases that have more than compensated for the lower rate of production growth of the United States relative to the EEC. In the service sector the ratio of product per American worker has grown at a rate less than one-fourth of that of the EEC. In the United States' manufacturing industry, the increase in productivity has been slightly higher than half that of the EEC. Generally, in the United States the increase in real income has been translated into a high absorption of workers, whereas in the EEC the labor force was contracted, thereby conferring to them a rising income level.

1.6. Industry and Employment

A short analysis of the quantitative state of the potential working population in the industrialized nations (first and second worlds: the voluntary and involuntary unemployed, as well as the long-term unemployed) is necessary to complete the picture. By 1983 OECD countries registered 33 million unemployed (10.1 in 1970): an incremental rate of from one to three. Details of the countries of particular interest in our study are given in Table 4. Italy is the country in which the percentage increment of unemployment from 1970 to 1983 has been more modest (+105 percent), though it is obvious that the comparison began at an alarmingly high initial level.

However, the constant growth in both absolute values and percentages has been progressively curbed. If the percentage increments relative to 1970 (base year) are compared, one may notice an increase of 34 points between 1975 and 1980, 33 points between 1980 and 1982, and only 19 points between 1982 and 1983.

According to most recent figures[4], the OECD rate of unemployment was stabilized at around nine percent by 1985, and this phenomenon will globally affect the same number of people as in 1983, about 33 million.

However, this figure is composed of partial coefficients that vary greatly among themselves. If the estimated unemployment rate for the United States is slightly less than eight percent, and the one for Japan remains under three percent, for Europe it is estimated that there will be an additional rise in the rate of unemployment from 10.4 percent in 1983 to 12 percent by 1985; a total of over 20 million unemployed persons.

It is certainly not a bright prospect for our continent. In Italy the rate of unemployment had already reached 11 percent by 1983 for a total of 2.3 million unemployed, with the younger population accounting for a very large portion.

The prolonged recession in all Western nations appears to have caused not only ever-increasing unemployment levels but also the inability of many economies to generate new jobs. The recent indicators of economic recovery should persuade governments and administrations to change their employment policies from a defensive posture to a more stimulative and positive one. However, the phenomenon has reached such magnitude, especially in Europe--as can be seen from the estimates[5]--that it would be necessary to create in the entire OECD area no less than 18,000 jobs per day until 1990 to reach the 1979 employment levels (19 million).

1.6.1. Employment and New Technologies

To date, the technological changes have been viewed as an additional source of occupational growth. If at first the introduction of a new technology causes some loss of jobs, it is also true that the same technology later creates new ones. Such as been the case for every major "technological revolution" that accompanied the major changes in industrialization and their repercussions on the labor market.

However, from the beginning of the early 1970s, the equation, "technological change equals employment growth," did not appear to be so linear. The impact of the wave of new technologies--from microelectronics to computer science, or from telecommunications to biotechnology--has had a wide and diffused impact so as to upset the entire framework; an impact far beyond that of preceding new technologies.

Its shock wave has, in fact, been felt across all the fields--no longer in the secondary sector alone, but with equal if not greater intensity in the primary and tertiary sectors.

Industry, agriculture and services--including all the public services from health to education--must be restructured, owing to the effect of the new technologies. Their multiple applications are de-

monstrated throughout each of the three sectors and represent savings not only in raw materials and energy, but also in labor.

At this point, widespread fear has arisen that, unlike the past, technological change will not necessarily imply gains in employment, but rather the contrary.

It is true, however, that the introduction of new technology in the form of products or production can mean growth for both the domestic and international markets. It can have more positive than negative effects on employment, as has been the case so far. On the other hand, the risk of a delay or the lack of introduction of new technologies can hurt employment even more as it obstructs domestic and international market shares, further increasing unemployment. The scientific and technological impact obviously cannot be ignored.

The effect of new technologies on employment can be much more severe if transmitted to a given country through international trade, rather than being developed internally.

1.6.2. Employment and High-Tech Enterprises

The employment situation of high-tech industries deserves particular attention.[6] This group of enterprises plays an increasingly important role in both domestic and international trade. Its peculiarity is owed to the fact that in recent years employment fluctuations have been negligible. Very few jobs have, in fact, been created or eliminated.

The labor force in this industry doesn't exceed five percent of the total work force, even in the countries most technologically advanced; the variations in this sector don't have a considerable effect on the labor market of a country as a whole. Moreover, the increase in output and productivity that the high tech firms represent[7] is accompanied by low rate of employment growth.[8] The estimates proposed for the U.S., which indicate the creation of 23-28 million new jobs between 1982 and 1995, attribute only 1 to 4.6 million jobs to high tech firms (depending on the definitions given to one or another type of firm). Even the most optimistic forecasts indicate that this sector will not employ more than four percent of the total United States labor force in 1995, as will be shown below.

High-tech firms are viewed more as generators of wealth than creators of new jobs. The effects that they bear on employment, however, are quite strong because the implementation of their products influences other economic sectors.

The prospective impact on employment obviously depends on the velocity and the extent of the diffusion of its applications, and the different balance that will result from the initial effect of the first distribution of jobs and the change of demand for improved or new products and processes derived from the application phase.

However, one can reasonably state that new technologies will generally have positive effects on a qualified work force and negative effects on a less qualified work force. The jobs created will require higher specialization and a superior technical background than that required by the lost jobs, as will be pointed out later.

In the electronic engineering and computer science sector, some countries, such as the United States, have registered a scarcity of sufficiently qualified personnel. Nevertheless, the educational system surely cannot be entirely structured on preliminary planning of future demands caused by the new technological developments, and a delay of the educational system with respect to the demand for the new qualifications should be considered purely physiological. Yet this is the system that must be able to trigger a quick reaction through a suitable process of permanent education and in-service training.

1.7. The Employees' Perspective

The role of human capital in the evolution of the occupational structure is partially related to vocational training. This is one of the "soft levers" of change within the working sector. Recent OECD studies have shown that the quantity, quality and distribution of vocational training play a fundamental, although not easily quantifiable, role in the development of individual careers and in the overall economic performance of a country. But the quality of "human capital" is, in fact, determined by many interacting variables, such as the system of salary determination, the methods of organizing work, state intervention and social and cultural traditions.

But the specific problem is the following: in a phase in which technological evolution as well as industrial restructuring become rapid, what is the momentum and the limit of the adaptability rate of national systems of vocational training and of the means for industrial reconversion?

One cannot deny that the problem of quantifying the relationship between human resource development and economic growth is enormous.

The category of intangible capital includes the derived values of expenditures made for education, professional training, health and mobility.

According to Kendrick's estimates,[9] the human capital of the United States is appraised at 75 percent of the value of material investments. Also, the relative proportion of human capital has increased: in 1929 it was not even one half the value of material capital (27.6 percent).

Another factor of primary importance is the growing role of public intervention.

For example, the Swedish system is able to generate 50.000 jobs per year for the unemployed or those who are about to become unemployed.

In an economic environment such as the Swedish one, this is equivalent to a three percent recycling of manpower per year.

In Great Britain the absolute figure nears 60,000 jobs per year, but the corresponding rate reaches only 0.25 percent of the total manpower.

It is clear that limits to human resource adaptability in the economic evolution persist, regardless of adopted policies, and are sadly confirmed by the increase in the duration of the unemployment period as a function of the age of the unemployed.

1.8. The Pace of Industrial Restructuring

One may accurately observe that the advanced European economies must of necessity modernize if only to safeguard their position in the international market and to avoid losing ground to external competition.

In substance, this means that production must conform more and more to technological evolution and demand, and that manpower will have to be adequately qualified in order to be redistributed from one field to another.

The pace of readjustment of the labor market can be attributed to the combined action of several factors such as the rise of demand in the service sector, the advent of new technologies, international competition and, last but not least, energy prices. If one analyzes the sector most susceptible to evolution, such as the classic industrial sector, surprising findings will be noticed. The pace of job restructuring has so far been very moderate.

For the period 1973-77 the index of employment redistribution of the principal OECD members reached an average figure of 3.1 per year. The peak is found in the United States at 3.5. The rate of global mobility has more than doubled with respect to the initial period--1.6 for the period 1955-60. The greatest rate of increase in job redistribution belongs to Japan--3.1 between 1973-77 as opposed to 1.1 between 1955-60.

1.9. Industrial Restructuring and Careers

Despite the fragmentation of the available data there is a long-term trend that favors "white-collar" over "blue-collar" jobs. Yet some contradictions emerge here, and some rather homogeneous data refutes persistent common assumptions, as in the case of the British mechanical industry.

There, the "qualified workers" employed by industry diminished from 21.1 percent to 18.5 percent between 1967 and 1977.

The category of the skilled work force, which includes "technicians and designers," has not greatly benefitted, although its percentage went

from seven percent to 7.4 percent; rather it is the less qualified workers (or unskilled) who see a rise in their share (from 31.3 percent to 35.1 percent).

This statistic should not be considered absolute, although the old notion has been confirmed that to an accelerated and unwisely-planned restructuring (known as "wild restructuring") follows a dequalification and a less clear individuation of duties rather than a valorization of the functions.

Even in the most expanding sector--services--next to the nucleus of professionals and technicians, particularly in the production-oriented sectors, a large strata of unqualified, low-paid workers--mostly women and the young--coexist.

Another consideration underlines the extent of the phenomenon associated with the failure of matching available human resources to the emerging needs of production.

The statistical studies most often supply the net, instead of the gross, flows of manpower mobility between the various sectors. For example, between 1966 and 1976 employment decreased in the British manufacturing industries at a rate of 100,000 units, while other industries, the service sector in particular, gained about 120,000 jobs per year. During this period Britain actually registered between 9 and ten million job losses, including unsuccessful job entries. Even taking into account five million departures from the work force due to retirement, death, study reasons, etc., enough manpower mobility remains to satisfy the needs associated with the evolution of the productive structures.

Despite the factor of work force in-flows affecting the market, this human capital plays, at most, a minimum role in the process of industrial restructuring.

Thus, when a variation of functions or a change of the site of the firm is added to a change in the industrial sector, manpower mobility is no longer guaranteed and tends to develop into permanent unemployment.

There are three possible areas of intervention, depending on the approach undertaken, for readapting the labor market to the needs of industrial restructuring: a "recycling" policy if the person's training does not adequately correspond to the required qualifications; an incentive policy to promote mobility in situations where residence does not correspond to areas of job availability; and a policy that guarantees the equality of rights regarding job entry conditions.

In the industrialized countries, the policies are, in fact, focused primarily on the first area mentioned, supported principally by the public sector. The extent of the impact of this intervention in recent years can be evaluated by observing total expenditures incurred by countries for vocational training as a percentage of GDP.

Although the statistics do not differentiate between pre-job and on-the-job training expenditures, some elements clearly become manifest.

Some countries, such as Japan, spend modestly for vocational training and recycling: a mere 0.04 percent of GDP in 1976 with an increase of 100 percent with respect to 1969 (0.02 percent). Japan is one of the countries that emphasize direct financing for vocational training by the firms themselves. Figures apparently indicate Sweden as the country with the greatest amount of "recycling" intervention, reaching the highest level (0.72 of GDP in 1976) with a 300 percent increase in relation to 1964.

For Great Britain, the United States, and West Germany, the increases appear more modest and delayed: for the United States, only 0.26 of GDP in 1976, with a much higher rate of increase with respect to 1969 (0.09 of GDP).

1.10. Technological Reconversion: A Model Case

A realistic example of the current characteristics of technological reconversion has been recently described by Italtel, a leading Italian firm. It is the largest public manufacturing company in the telecommunications sector and is undergoing a vast technological transformation toward electronics, affecting methodologies, project instruments, production processes, products, and modifying its organizational structure.

At the point where it is necessary for an industrial sector to undergo production restructuring, unusual events are encountered that are risky from an economic viewpoint and painful from a social viewpoint. These are events that in recent years have become far from infrequent. This subject is being more widely discussed, even though few serious studies have been conducted. In Italy, for example, only Italtel has promoted, through Bocconi University of Milan, an attempt at institutional research (coordinated by Professor N. Della Chiesa, synthesis by G. Speciale).

In 1981 Italtel had a 200 billion lires deficit, employing over 28,000 personnel. It was necessary to initiate an extensive production reconversion plan with the inevitable effect of a radical change of how and what to produce, coupled with a large turnover in the work force.

This great undertaking has required an operation seeking as much consensus as possible among the same labor unions. It was an effort finally rewarded by success. In 1984, Italtel closed its books in the black, even though its personnel was reduced to less than 20,000 units, a reduction of almost one third. Since 1980, employees have been decreased by 8,500 units to the present 19,700.

The process is not over as of yet. By the end of the 80s, the number of employees will be reduced further. It won't only be a question of numbers--initially the ratio of blue-collar to white collar workers was two to one; by the end of the decade it will be inverted. It is clear that "blue collar" refers to factory work that is predominantly manual

labor, whereas "white collar" refers to the other types. This is intended to point out that the conversion will require an even greater number of specialized workers. The hiring of recent college graduates contributes to the change in the blue/white collar ratio--from 1983, 450 were hired, especially for research and development.

Italtel has two of its main production centers in Milan and Aquila. A survey has been made to ascertain what happened in the two areas, which are so different from each other in terms of environmental conditions. One hundred and sixty persons were chosen in Milan and 96 in Aquila as a sample. This combined group of 256 ex-employees represented a little more than ten percent of those that had accepted, in 1981 and 1983, to leave the company as a result of an "incentives" offer.

They were asked to respond to a long questionnaire and everyone accepted. More than 50 percent of the people who chose to quit their job in exchange for compensation were 50 years of age or more. Among the men, the percentage reached two-thirds, whereas among the women a considerable number were under the age of 50. An initial result is that women tend to leave the factory earlier.

About half of the sample had finished elementary school, less than 30 percent had completed secondary school, 14 percent had professional qualifications, 7 percent had a high school diploma, and only 0.4 percent had a college diploma. Here is a second typical characteristic. He who quits is not only older, but also is penalized by a weak educational background, or, in other words, is educationally deficient. One must add that prevailing job qualifications in the sample are rather modest--an obvious corollary. Thus one can immediately understand the choice taken: the majority seized the opportunity because of long-term job insecurity; some had even experienced layoffs.

Others left because of "work weariness" (with this expression one intends a sort of dissatisfaction with their assigned duties); part of the "dissatisfied" were commuters. Others--for the most part females--left for family reasons. Others yet were attracted by the incentives.

On a general level it can be stated that those who left the labor circuit were primarily in their 50s, female, with little education, modest professional qualifications, insecure, and tired of work.

With another set of questions one sought to highlight the "aftermath," that is, the phase subsequent to leaving the firm. More than 70 percent did not find another job, either because they did not look for one, or they did not accept offers for jobs they felt were not rewarding. The rest had found part-time or full-time jobs. Several had found jobs even before leaving Italtel; others found them within six months.

It was surprising that the search for new jobs was easier for those from Aquila than for those from Milan. And it was also surprising to note that in their new jobs, two-thirds did not take advantage of the experience gained by working at their former jobs. The explanation for

this is that more than half became self-employed, choosing independent activities of "low-profile."

The ex-worker has not returned to be a worker again; he receives more satisfaction from his new work. Those who have sought and not found job opportunities are estimated to be only ten percent.

Indeed, those that had the best chances of recycling their profession were the highly skilled workers as well as the "upper level" employees, confirming that conversion penalizes workers with low professional qualifications. Of those who found new jobs: 53 percent had a high-school diploma, over 40 percent had some professional qualification or intermediate school diploma, only seven percent had only completed elementary school. In evaluating this data it is helpful to keep in mind that there were a high number of those above 35 years of age who did not complete the required minimum level of education.

If one then considers that at least half of those who left the production process had completed at most only elementary school, one has a more precise idea of the relationship between job expulsion from factories and level of education.

Another important factor in terms of training was that only three percent of the sample benefitted from vocational requalification courses following their Italtel experience. The absence of public opportunities for professional recycling has been considered as among the most critical bottlenecks.

Italtel's directors wanted to give a more concise and managerial interpretation of the research results. The company presently employs over 11,000 people just at the Aquila and Milan facilities. Judging from the acquired data, the following was observed:

- incentives did not induce people to leave their jobs;
- those who left the circuit were essentially women and low-level workers with modest training;
- a part of those who left were subsequently absorbed by parts of the poorer tertiary sector.

One might also conclude that:

- school plays an important role in the turnover phenomenon. It should be noted that those entering today's labor market face the prospect of changing jobs at an average of five times during their lifetimes; and
- one should be alarmed by the fact that there are no retraining opportunities offered by the public sector.

But what function, one might ask, should be assigned to work in advanced societies? Today there is disagreement on considering work as the most typical form of industriousness. The "nonworking" time is increasingly thought of as a time of research for development opportunities of new potentials, a time devoted to fantasy and creativity.

The research has not thoroughly examined the educational analysis of the phenomenon, although it was recognized that educational levels, both pre-job and those tied to requalification processes, play a fundamental role in the problems discussed. But what exactly is this role? This is the point from which the investigation should continue.

References

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[2] T.H. Bell, *A Nation at Risk*, report of the National Commission on Excellence in Education, Washington, D.C., 1983 (a synthesis was published in Dialogos, n. 95-96, July-December 1983).

[3] W. Lentieff, et al., *The Future of the World Economy*, United Nations, New York, 1977.

[4] OECD, *Employment Growth in the Contest of Structural Change*, Paris, 1985.

[5] OECD, *Employment Outlook*, 1984, and OECD, *Economic Outlook*, n.34.

[6] The definition of "high technology industry" currently used by the OECD includes aircraft and their components, office machinery and equipment, equipment for the transmission and distribution of electrical energy, professional and scientific instruments, plastic and synthetic materials, motors and turbines other than for air transport, industrial inorganic chemical products, communication equipment and electronic components, and medical and pharmaceutical products.

[7] For example, "output" has grown seven percent annually in recent years in the United States alone, compared to three percent of the entire industrial sector, and productivity has grown seven times faster than that of the industrial sector.

[8] Once again in the United States, one percent of this sector compared to an average of two percent in the industrial sector.

[9] J.W. Kendrick, *The Foundation and Stocks of Total Capital*, N.B.E.R., New York, 1976.

Chapter II

The Near Future of Employment

2.1. Decline and Revival of the Wave

Forecasting on this subject must take into consideration a basic hypothesis of the socio-economic trends of the Western countries, particularly the European ones. Obviously, this hypothesis should correspond to previous experience, and especially to the well-known theory of the "long wave," first proposed by N.D. Kondratiev and subsequently further developed by J.A. Schumpeter and G. Mensch. According to these criteria, from the 1970s the increase or decrease of economic development in the aforementioned countries suggests that the two previous decades (those of the boom) formed the exponential phase of a curve that runs toward the asymptotic level, and later results in a tendency toward diminution. If this were true, we would have entered into the falling phase of the present long wave approximately ten years ago. However, this should bring about the possibility--and this is the main point--that if a set of basic technological innovations (the revolutionary innovations, distinguished from the regular technological evolutions as many be seen by the above-mentioned "factory without workers") constitute in future years the so-called "cluster" of transformations, capable of making up the new engine for a successive growing phase of the new long wave, this very wave is what we should expect from the beginning of the 1990s. It goes without saying that we are still in the domain of hypotheses, although reasonably futuristic, and at this point an additional hypothesis must be put forward.

What seems plausible, in regard to employment's near future in the wake of the new long wave, could be defined, to use a military term, as a breakthrough in the center front line and an unbalanced emphasis on the wings. In clearer terms, it appears that we will witness a drastic reduction (and eventual disappearance in some cases) of today's central employment structure. Those occupations presently found in the lower echelon will experience impulsive growth; those concentrated at the top will register a greater percentage of development, but decidely a more moderate one in absolute terms.

The consequences of such an imaginary dramatic breakthrough in the center of the occupational realm are less foreseeable in terms of the future reorganization of the whole social structure.

If the middle class decreases or changes, our society will be radically changed. For example, perhaps the first group to be affected and upset will be the intellectuals, who for the last two centuries have represented the fulcrum of industrial society's tensions and who have

perpetuated the system by means of the educational process. If the mediations of widespread consensus transfer to other message channels (especially those of information), the future niche of intellectuals will have to be refounded in the smaller but more sophisticated workshop of the advanced professions. In effect, it will probably be the humanists who, besides saving themselves, will save the possibility of a relationship between the information structure and the future community, and will redesign the style of a new society, perhaps the one of "basic plus the individual."

Further, the imbalance between greater availability of total wealth and growing social imbalances (there will be both more rich and more poor than is presently the case) will once again bring to the forefront the needs of equity attention to social dynamics and the equality of opportunities that were previously the subject of minority attention during the boom years and that faded with the rise of Reagan's freezing economic creed (the recent "letter on the economy" of the United States bishops is a clear signal of this).[1]

2.2. Close-up Exercise of Employment Forecasts

The available literature on employment forecasting is already extensive.[2] The authors advance their greatest reservations concerning the verifiability of forecasts which, nonetheless, should be accepted not only in the normal framework of uncertainty, but also in the framework of political incentives designed to achieve a cherished future.

The subject matter could be considered under the two-fold aspect of job entry and the corresponding working conditions.

2.2.1. Job Entry

In the major industrial countries there is evidence of the already mentioned long wave effect and its on-going phase. In Giannini's research, a study of the Bank of Italy finds that "after the rapid fall of activity (i.e., new jobs) rates during the 1960s, and continuing until 1973, beginning with the first petroleum crisis, one may observe an opposite tendency. Although it isn't sufficiently strong to permit a complete reabsorption of the percentage decline, the growing trend has once again raised the rate of global activity above the 40 percent level in the first years of this decade." According to the Bank of Italy, in seven of the major OECD countries--except for the United States and Canada who show constant advances--the same tendency was observed: "decline during the first half of the 1970s and subsequent recovery" (see table 5).

As can be seen, the points of decline coincide in most countries between 1972 and 1976 (if one excludes Japan between 1972 and 1974), after which the recovery is constant (except for the steady positive trend of the United States and Canada).

As far as the Italian labor supply forecast is concerned, the study states that "the labor supply in Italy will probably increase during the next ten years by about 900 thousand units as a result of demographic forces alone. Therefore, the labor market will probably be subject to new tensions, as this large number of people will join the 2.3 million unemployed as of 1983. Taking this into perspective, the development problem, or more precisely the creation of new jobs, becomes crucially important."

These hypotheses are proposed by the Italian Labor Ministry in its employment projections for the next decade.

On these assumptions, the goals of higher employment for the near future in Italy are summarized as follows:

"Assuming constant activity rates, the absorption of the additional supply would require a yearly increase of about 90,000 jobs, while the goal of full employment would be reached only if 300,000 jobs were created annually. In projection the situation would be worse: 160,000 jobs per year to absorb additional supply, and almost 400,000 to attain full employment. To make a comparison with the past, it is necessary to consider that during the 1970s, one of the most favorable post-war employment periods, on the average 130,000 new jobs were created annually with a total increase in employment of seven percent."

"The goal of lowering the present unemployment levels thus seems to be a highly difficult task for the near future. It would be more reasonable to target the absorption of the additional supply; during the next ten years this would require a total increase in employment between 4.5 percent and 8 percent--not an impossible goal in light of past experiences."

"Naturally, these indications must be viewed with caution, as the accounting logic upon which they are based could lead to this wrong conclusion: the more rapid the growth of productivity, the more difficult the absorption of the unemployed. From an economic standpoint the opposite is true, since a steady sustained rise in growth represents a fundamental condition for stable economic development and, therefore, for an increase in employment." It is within this framework that the EEC considers its perennial goal of full employment to be "out of reach."

2.2.2. Working Conditions. Two Scenarios: The United States and Italy

It is at this point that the above mentioned "breakthrough at the battle line center" could occur. It is not intended to be the only novelty, as

its course is complicated by other perceptible and sometimes contradictory phenomena in the world of production and labor. These are job dequalifications induced by growing automation of former jobs and its opposite, hyperqualification required by new jobs and the emergence of new professions. All this is partially true today and will become more so in the future; but perhaps this complex pattern will revolve around a central axis, which is the polarization of productive activities and of associated professional roles (the "breakthrough at the center").

In this perspective it is interesting to attempt an analysis of the American and the Italian scenarios, which until now represent respectively the apex of world economy and research, and an average size European laboratory. In the United States the impact of more sophisticated technology dates back at least 20 years. This is a sufficient time span to determine not only global effects, but also the effect on common human conditions. The internal dynamics of the various states are certainly considerable as evidenced by the rigid classifications of affluence periodically published, showing Texas and California as the leading states. However, at this point, the macrosystem is of primary concern. The first consequence of the pervasiveness of information (Levin and Rumberger report that American observers estimate that between 40-50 percent of United States workers will use computer terminals by 1990) is that of having set in motion an analysis of its impact on the educational and working systems.

The first effect seems to be a very negative one, namely the increasingly consistent decline in the level of skills required to enter labor intensive working sectors already including the greatest number of workers. Actually, these sectors will be influenced by the combined effect of deprofessionalization and of the higher rate of quantitative increase as a consequence of the previously cited breakthrough.

According to the two above-mentioned authors (see table 6), the five principal professional activities that will register the most consistent increases in absolute terms appear to be janitors, assistant nurses (lower level paramedical personnel), retailers (department store employees in contact with the public), cashiers, and waiters.

These five occupational groups will account, during the period considered (until 1990), for 13 percent of total growth, while only three or four of the 20 occupational groups projected to greatly influence the work force will require an educational level higher than upper secondary education. Only two require a college degree: teaching and the more qualified paramedical activities.

The direct comparison between high-tech occupations and those that are dequalified and unaffected by technological transformations clarifies the phenomenon even better: the number of analysis for computerized systems will grow by over 100 percent according to these forecasts, but in absolute terms 200.000 new jobs will be created. On the other hand, there will be over 600.000 janitorial job possibilities. One

should also compare the relative data concerning new computer programmer jobs (estimated at 150,000 in 12 years) and "fast food" restaurant employees (around 800,000).

The analogous forecasts of the United States Bureau of Labor Statistics indicate a modest increase in the technical and managerial professions. These categories have grown 36 percent from 1960 to 1970, 45 percent between 1970 and 1980, and are estimated to grow only 28 percent between 1978 and 1990. In the same time period office and low-level executive jobs should grow by 40 percent.

Such analyses, as confirmed by other government sources such as the Department of Defense, indicate (second effect) that the future development of employment will correspond mainly to those activities that generally do not require particular vocational training and that do not even necessitate post-primary education. In the near future, job applicants, in the United States will not be required to possess high level educational degrees.

Levin and Rumberger conclude that according to the United States Bureau of Labor Statistics, 22 million additional jobs will be created between 1978 and 1990, equal to 23 percent of the active labor force. But the great majority will be concentrated at lower levels. The information professions will double in terms of employees, especially in the software areas, while the others will not grow by more than one fourth: hence 100 percent versus 25 percent, even though the former offer fewer and more sophisticated job opportunities. Thus, the future appears more conducive for circulating wealth, less difficult for modest jobs, more tense for the top jobs, and, on the whole, a lower profile.

Silvestri, et al. (see note 2c) have prepared several interesting tables regarding 40 United States professions with the highest increases of growth, 20 with the greatest decreases, and 20 with the most rapid development between 1982 and 1995 (see tables 7, 8, and 9).

The average training of today's working population in the United States market remains at remarkable levels: 20 percent of those employed have a university degree while employment forecasts for the highly trained are in decline. Nevertheless, it is also true that, as a whole, those who are best educated have better chances of entering the job market even if at levels not correspondent to their training. The social and psychological effects of this incoherence are well known and widespread in Europe.

The Italian scenario is at the same time similar and dissimilar from some time ago. In regard to manpower the dynamics of growth have already been observed. At the end of the 1990's one can project the following distribution of labor: agriculture--10 percent, industry--35 percent, and services--55 percent.

The new labor supply will have an alarming as well as challenging age structure: over 90 percent will be concentrated in the young age bracket

of between 20 and 30 years. About six million of these will have either a high school or a college diploma.

In particular, the rate of those with high school diplomas will increase from the 1980s level of 15.2 percent to 20.6 percent, and that of the college graduates will increase from 4.9 percent to 6.4 percent.

Moreover, according to the Italian Labor Ministry forecasts, the largest occupational aggregate in the industrial sector will be concentrated once more in the sophisticated sectors, but at a lower occupational complexity that will extend and strengthen the traditional sectors. As Minister De Michelis states, "it is a question of saying 'no' to sectors such as thermonuclear or aerospace (obviously "no" does not mean total abandonment of such sectors, but the selection of strategies); it is a question of saying 'yes' (here also with an appropriate strategy of international cooperation aimed at making the most of our present "know-how" as well as a contribution to our present and future markets) to sectors such as telecommunications, telematics and the advanced components sector. It is above all a question of saying 'yes' to those sectors defined by public opinion as developed and intermediary such as the clothing, shoe, food, furniture, auto, home appliance and capital equipment sectors."

No less interesting is the evolution of the service sector and the increase of private employees (see table 11) between 1980 and 1990, as opposed to the preceding decade.

Sectors registering high growth rates (over 20 percent) are finance and insurance, general services (self-employed professionals, and various associations and institutions) and communications. The same occurs for the wholesale and retail trade, with both exhibiting a polarizing tendency toward the extremes, namely small and large stores.

Sectors that will undergo average growth through the 1990s are public employees (excluding teachers), hotels, public companies, and domestic transportation.

Other domestic sectors such as maritime transportation, airlines, and public school teachers trail with zero growth. Teachers represent the most clamorous case of the inversion of the tendency, leveling out after a growth of over 50 percent between two decades. The stability of the total number of teachers results from a reduction of the population below age 14 and from the completion of the regional decentralization process.

This will cause a slow down in the turnover of teachers which will require carefully planned in-service training programs for them and career orientation programs for young trainees.

The most dramatic forecasts thus affect the teaching profession. If one considers its present state, which includes a large surplus of student teachers as well as teachers with tenure but no one utilized for makeshift duties, one may easily conclude that today's number one

priority is a teachers' policy that momentarily closes some access to the teaching profession as it paves the way to a brighter future.

To this one must add the impact of the transformation of old professionals which will occur according to an interpenetration of both manual and nonmanual jobs. This is the striped collar phenomenon--a blend of blue and white. According to Enea (Italian Energy Agency) there will be good opportunities for cross-occupational employment in the three classical sectors. A good example is given in table 12.

Perhaps the teaching profession will be referred to as such in the near future. The predominant trend appears to be that of avoiding the strictly sectorial and monodisciplinary placement of informatics (except in the appropriate technical schools and the specific university faculties) and expansion of this new culture to develop--as also will be necessary for every social worker in the coming years--a good basic knowledge of computer systems, whatever their specific fields may be. In other words, the humanities specialist, the historian or the naturalist will have to supplement their professional knowledge with information infratechnology. P. Ercoli[3] proposes an addition to the training received (which also applies to the training of future teachers), consisting of six parts:

- complements of logics with narrow reference to their practical applications;
- introduction to the analysis of systems behavior based on relationships between inflow and outflow and according to the increasing or decreasing abstraction from the details;
- structure of processing systems with reference to networks and basic software;
- data structures, languages, programming techniques and program documentation with specific reference to graphic and textual processing, and mention of logic programming and artificial intelligence;
- psycho-pedagogical problems resulting from the inclusion of information sciences and, generally, from the new teaching technologies and appraisal of their effects; and
- pedagogical applications of simulation techniques, text processing, graphic presentation, planning of problems and questions, interpretation and correction of the responses and mentions of the author system.

A parallel of the opportunities offered by the new professions of the 1990s in the United States and Italian scenarios has been drawn by U. Colombo, based on the work of Cetron and Helms (table 13).

2.2.3. Services and Employment Growth

In the Western industrialized countries, 6 out of 10 people, on the average, are employed today in service-related areas. The proportion was 50 percent in 1971 and 42 percent in 1961. For the sake of comparison, industrial activities constituted 36 percent of total employment in 1961 versus 32 percent in 1981.

This degree of "tertiarization" of the economy greatly varies in each country. In 1983 it reached 60 percent in the United States and Canada, while in the other developed countries it ranged between 50 percent and 65 percent.

Employment in the service sector has thus registered an impressive development in the last 20 years. Seventy-two million jobs were created in the OECD zone at an average annual rate of 2.5 percent, exceeding even the total working population increase of 60 million units, with a rate of increase of 1 percent each year. This was caused by a decrease of employment in other sectors.

For the most recent period (1975-1982), the rate of increase in employment in the various services tends to slow (two percent annual average with peaks rating from one percent (France) or less (Germany 0.4 percent and Spain 0.3 percent), to 3.3 percent in Holland and to 4.1 percent in Greece).

If one analyzes the services' ability to absorb the additional demand for labor (defined as the sum of the increase in the working population plus any transfers from the primary and secondary sectors), very significant and diverse results are obtained, ranging from 70 percent in the United States and 77 percent in Japan, to 49 percent in Europe as a whole.

Furthermore, employment in the service sector also seems to be less influenced by economic stop-and-go than the industrial sector, even if it's rate of increase shows a slowing tendency. The aggregate of service activities is quite heterogeneous and it would be useful to divide it into parts.

For our purposes, a look at services rendered to industry and social services merits attention.

2.2.3.a. Services Rendered to Industry

From one-fifth to one-third of the employment in the service sector hinges upon or supports industrial activities.

The necessity of reducing production costs has led to a utilization of microelectronic or information technologies, permitting exceptional increases in productivity in at least several areas. The increased wealth has, in turn, induced an increased demand for the transportation, distribution, communication, and financial services rendered directly to the firms.

The same industries turn directly to firms that specialize in services for reasons of cost, economy of scale or for their ability to master diversified production activities. The production of some of these services coupled with the subsequent employment growth can thus partly account for the simple transfers of activity from the primary and secondary sectors to the tertiary.

This complementary relationship could signify that the employment pattern in this category of services will be even more tied, in the future, to investment prospects and the markets of industrial firms.

Along with the services rendered to industry, it is useful to consider the employment related to the so-called financial services, including bank and insurance activities. This sector represents a modest quota (from an average of four to six percent) of employment in the tertiary sector of the industrialized countries.

2.2.3.b. The Social Services

The category of the so-called "social services" accounts for between 30 and 50 percent of employment in the entire sector. Its average annual rate of increase in the industrialized countries is steady, varying from one to six percent.

In the social services category are included the public and private services in which employment has evolved at different rates:

- public administration, both central and peripheral, in which lack of employment growth is related to financial restrictions;
- public and private education where employment depends on demographic evolution and societal demands on education, including demands for higher-quality services;
- public and private health which has undergone a high demand for services, especially from the early 1970s, as a result of the progressive aging of the population as well as the rapid diversification of specialized services offered.

Until the mid 1970s, employment in public administration grew at a rather steady rate (an annual average of 2.6 percent per year for OECD

countries), then slowed significantly to an annual average of 1.3 percent for the period of 1975-1982.

Beginning with 1973, in many countries (mainly the United States, Japan, Great Britain, France, Australia, and Switzerland) the rate of increase slowed (an average of one percent) while in the Scandinavian countries it grew at a steady rate with an annual average increase of 4 percent. Nevertheless, public administration still represents an important employment source.

In any event, employment in the so-called collective social services, whether public or private, demonstrates some features common to every country: high manpower intensity as opposed to low capital intensity.

Moreover, the manpower involved in these sectors may be divided into three large groups: in addition to a restricted percentage of highly qualified professions, one encounters a large category of medium-level employees with a high female component and an increasing tendency toward part-time work. Lastly, there is a minority of low-paid, unskilled manual laborers. The "breakthrough at the center of the battle line" effect will foreseeably have a great impact on the medium level category. A prospective appraisal of the aggregate, could lead to the conclusion that the process of "industrial tertiarization" and "industrialization" of the service sector is in progress.

The employment growth in the tertiary sector should continue, albeit at a slower pace, thus prolonging the tendency begun in 1975. During the 1980s it should range between 60 percent and 80 percent of that registered in the 1970s; the most productive services in terms of employment should not differ from those of the past decade, involving services rendered to firms and certain social services.

Employment growth in the service sector remains dependent on economic and financial variables as well as on components on which appropriate political forces may act, particularly those addressed to the promotion of new forms of production and services resulting from new technologies. The latter, in turn, suggest once more the well known problem of low service productivity, which has hitherto assured the availability of a high number of jobs within the category.

Even this reserve could dry up. It is here that a global reshuffling must be used to advantage. The nonproductive, cliental reservoir of low-paid, inefficient occupations can be replaced by the generation of new services, namely information, mass culture, education, and health. These new services could be basically economic, rationalized, extensive and capable of generating new employment. The final impulse should be in effect by the mid 1990s, taken from a hypothesis put forward with conviction as well as with a high degree of willingness: the transformation of a plodding, agricultural Europe through the common market of services.

References

[1] See *Catholic Social Teaching and the U.S. Economy*, Origins, vol. 14, n. 22-23, 15 November 1984.

[2] The best known analyses are: a) M.G. Cetron, Th. O'Tool, *Encounters in the Future: a Forecast of Life in the 21st Century*, McGraw-Hill, New York, 1982; b) H.N. Levin, W. Rumberger, *The Educational Implications of High Technology*, Hearings before the U.S. Senate, March-april 1983, U.S. Government Printing Office, Washington, D.C., 1983; c) G.T. Silvestri et al., "Occupational Employment Projections Through 1995," Monthly Labour Review, vol. 106, n. 11, November 1983; d) C. Giannini, *L'Offerta di Lavoro in Italia*, Servizio studi della Banca d'Italia, January 1985; e) N. Cacace, *Professioni e Mestieri del 2000*, Angeli, Milan, 1983; f) Italian Ministry of Labor, *La Politica Occupazionale per il Prossimo Decennio*, Draft of a document by Minister De Michelis, Rome, August 1984; g) R. Moscati, *Processi di Trasformazione del Sistema di Istruzione Superiore negli Stati Uniti*, typed, compilation of texts by Rumberger and others. The data circulating in Europe is based primarily on the first three volumes cited.

[3] P. Ercoli, Strategie di Formazione degli Insegnanti, typed ms., pp. 4-5, EEC Convention "Teachers Formation," Bologna, May 7-10, 1985.

Chapter III

What Should Be Done About the Future?

3.1. The Main Reference

The answer is not simple, but at least we know where to look for it: in the research and education system. It is necessary to emphasize the close synergy that, on a method level, the two systems must have. Indeed, one of the major components of the so-called "educational crisis,"[1] which has spread to and affected every country, is the lack of applied scientific analysis rendered more severe by maturations intervening in the education systems from the end of World War II untill the present. We are lacking in the availability of results of educational research utilized for the improvement of the whole. We also fail to emphasize the importance of society's impact on education, and the effective fallout of the advancement of knowledge in the areas of school and society.

It thus seems insufficient to ask which demands the near future pose to the educational system, especially in regard to employment. One must also try to establish whether the presently available "school apparatus" serves as a means to the end, and whether and how to intervene to endow it with the capacity to answer new questions, or to let it run its own course.

3.2. The State of the Educational System

While taking for granted the implicit dangers in the generalization of an obviously complex and not easily appraised phenomenon, some firm points can be made concerning the recent past as well as the future:

- First, there is a sense of widespread dissatisfaction with the educational system. It affects everyone--politicians, parents, students, teachers, and researchers. Nevertheless it is also true that the kind of dissatisfaction is different in quality among the various groups and ranges between intense interest and total apathy.

- Second, during the 1950s one witnessed the demise of the old structure based on a custodial preschool; reduced compulsory schooling in terms of years and content (reading, writing, arithmetic); and, finally, on two levels, secondary and tertiary (age groups 14-18 and 18-24), all rigidly channeled and highly selective.

- Third, the new phenomenon of the boom years was the explosion and diversification of secondary education. Here are two examples selected from the many possible ones: The 32,000 high school diploma candidates in France in 1950 had risen to 400,000 in 1983 (OECD, Ceri, CD (84) 3); and the beginning of the end in Italy of the traditional wide range of specialization and hierarchic division of secondary schools.

Even if it is historically correct for the 1960s, the contemporary trend of "economic development--educational development," should nevertheless not lead to error.

The schools can be "in phase" or in "counterphase" with the economy. For example, the economy suffered a crisis in 1973, but the school crisis dates back to the 1950s. Today, despite stagnating economic conditions, the educational system is expanding and diversifying (preschool, secondary, university). This may not necessarily be due entirely to the effect of demographic patterns, as the numbers of individuals eligible for the various schools have increased. The education apparatus has its own dynamics that supplement or intersect with the social dynamics, including:

- Together with the two phenomena mentioned above, the cultural fall-out of the university on the secondary school has diminished, though not in absolute terms, since indeed the fall-out increases: the new phenomenon is the explosion of the secondary school in relation to its capacity to change. A system that is decades, if not centuries old, subjects itself to a series of experiments that make an autonomous laboratory of it. In some cases the secondary teacher also teaches at the university level; there is a two-way flow between the two levels, and not a one-way traffic as before. Hence, the end of the school's traditional inflexibility.

- The end, indeed, but also the continuation, if it is true that within the system the essential educational relationship, that of teacher-pupil, has not changed much. In class, more or less the same things occur--the verbal-conceptual culture used in the transmission of consolidated and legitimate knowledge is more or less the same. The new tools are incorporated with difficulty in the school--not only in the cultural paraphenalia of scholastic subjects, but also in the useful presence of informatics (table 14).

- The crisis is international. France, the United Kingdom, the United States, Germany and Italy denounce the implosion of didactic productivity, the devaluation of the role of teaching and its professional dequalification and relative loss of prestige--in other words, a general lowering of the system's profile. If Bell complains in 1983 that American students ignore orthography, already in 1950 Germany and

Italy were decrying the educational catastrophe marking the end of the classical school. Grumbles were frequently heard lest the educational channels of the ruling class disappear. The United Kingdom and France then chose to reinstate the basic subjects (new programs for the French elementary schools); Pythagoras' table and rules of grammar and pronunciation (rhetoric is advised to be studied again at the university) are regaining favor in the classroom. In the United Kingdom the projects of teaching French in the elementary school, begun in 1960, were abandoned and modern mathematics was not accepted into the curriculum. Only Italy, in partial counterphase, introduced teacher pluralism and the study of foreign language in the elementary school. As can be observed, this is a complex picture, but it outlines several clear trends.

3.3. The Suitability of the Means

At this point one might ask if the "school apparatus" is capable of satisfying the future occupational demands of society. It must be noted that the educational system was not designed, nor could it have been, with the labor market in mind. This gap is already evident.

The current school is national, favoring linguistic unity and national identity and expressing mainly the typical industrial culture of the last two centuries. Now all three columns are shaking. The "nation" staggers between the super-nations on one side, and the aggression of local cultures on the other; the linguistic unity is chipped away by ways of thinking and expression which creep into the national idioms (superlanguage and dialect). Industrial culture remains an important segment, but new divergent cultures stand alongside like root suckers in an orderly garden suddenly turned tropical. Ultimately, the teachers as purveyors of information, techniques and values in genetic mutation, struggle to keep pace and often appear as propeller plane pilots given the controls of, not supersonic jets, but spaceships (where "others" command). One finally wonders whether it is worthwhile to promote widespread computer literacy or if, instead, as future skills for the more labor intensive jobs dwindle, we should redefine our educational objectives based on different goals. After all, even today cars are driven when little is known about the internal combustion engine, whereas knowledge of the driving laws is more useful. The users of the educational product, for example, request new secondary school subjects (1983 Gallup Poll on public education in the United States), such as the nuclear age, international relations, communism and socialism, preparation courses for prospective parents, drug addiction, alcoholism, and so forth. Demand for sophisticated expertise in new professions is negligible, and no one concerns himself with the values it will be necessary to abide by when jobs become more modest and devoid

of certain attractions. In robotized factories, Japanese labor unions seek to prevent lay-offs (the warehouse man's position is bid for by the superfluous engineer), but ignore the social and cultural costs of this change.

3.4. Culture as School

In today's advanced countries--and thus in Italy--one may notice a phenomenon which, besides having old roots, appears to be substantially and peculiarly new: the cultural processes tend to be found mainly in the educational arena. School, in short, attempts to express, especially in the 16 to 24 age bracket, not only the value of waiting and the preparation for working activities, but, above all, an autonomous, self-contained world vision based on today's societies' modes of existence: in other words, culture and school become one.

The growth and diversification of educational avenues--typical of the socio-pedagogic revolution between 1950-1980--only partially explain the phenomenon. The phenomenon is, nevertheless, totally new in quality.

If one spends a quarter of one's life in school (one's whole life for teachers), in effect it is hard to describe education as a purely preparatory stage. Moreover, there is something more refined in the culture-school equivalence. In day-to-day secondary and university education many of us teach not only to the surviving generation but also to the sons of sons, students that, in turn, will teach those that will exist in the 22nd century, all producers of cultural values that come from and cyclically return to school.

The traditional school, typical of the industrial and preindustrial world, is thus disappearing, and the demand for continuing education (for adults, recurring, permanent and so on) is growing.[2]

Today, school is still all culture. In the intergenerational interlacement of educational processes that has become so extensive and productive, one finds the output of the new mixed with the ancient, and thus the clear indicator of the current and future cultural climate.

3.4.1. The Sixteen to Twenty-four Juncture

Educational stages are established in a conventional manner, as is done in the determination of historical periods, even if in some measure they correspond to different historical and social conditions (school starting age for example) or economic conditions (length of compulsory schooling), and so forth. This explains the non-uniformity of educational systems in the various countries and induces the often undesired effect of their prevalent rigidity. As one knows, school as a whole is

definitely conservative in the balance that it establishes between continuity and change.

This condition could justify this proposed hypothesis of evolution and settling of the educative system globally composed of two large aggregates: the first includes the obligatory group ranging from 0-16 years of age; the second includes the rest but specifically the 16-24 age group. One can imagine, on the basis of the foreseen changes of the social scenario described so far, a system that assures all citizens the greatest general fulfillment provided by the school service, thus assuring the imparting of the medium-low skills necessary to the functioning of the economic machine. It also places on the remaining group (as well as on the processes of continuing education) the major burden of difficult solutions to the coming changes in the social arena. The proposed establishment of periods also reconciles the two psychological sides of learning at an age mostly receptive (i.e., until the learner acquires self-conscience precisely by the end of compulsory education), and learning at an age that is prevalently active (i.e., post-compulsory school where the subjective incidence in determining one's own destiny becomes appreciable).

This hypothesis may explain why, in advanced countries, the "mandatory plot" is well-defined as a whole in its objectives, contents and methods while for the others school appears challengingly open to constitutive interventions, often alternate, or in any case widely discordant.

Since the near future and the cultural quality of our society then depends on the 16 to 24 age group, a further observation can be made on the present distinction between the high school on the one hand (16/18-19 years of age) and the university on the other. This gap--at least in Western Europe--becomes more and more unjustified with time either because of the autonomous creative role that upper secondary school has played for 20 years in the developed countries, rightly aligning it to the university, or because of the somewhat sophisticated qualifications that it often produces (keep in mind the present role of technical education in Europe), thus inducing the same alignment effect between the two groups.

3.4.2. High School and University

It is not by accident that in our time education's great developments have occurred--as seen in the situation of France, the United Kingdom, West Germany and the United States--in the post-compulsory field considered as a whole. It is also not by coincidence that the complex Italian society has until now failed in the same secondary and tertiary reforms, though making good conceptual efforts.

Clear indications of this Italian stalemate are the long history of high school reform (20 years of unfinished parliamentary attempts) and the no less troubled, remote and perhaps unattainable university reform.

The point of these two events, however fundamental, is quickly made. The high-school reform has reached its first provisional definition (the bill has been enacted by Italy's lower Chamber, but it is still idly pending before the Senate) simply because it was centered only on structural problems. All decisions on its content have been set aside. Finally, it is primarily the messages that the school gives that make a real philosophy out of it and definitely not the formal frameworks within which it is situated. This is what is lacking in the hitherto approved project.

University policy was designed by a complex set of norms, bearing the numbers 28 (delegated law of 2/21/80); 382 presidential order of (7/11/80 reorganization of university teachers); 590 (institutive law for new universities).

For this purpose the incentives offered by the new rules were essentially three: (1) the department and experimentation, (2) doctorate in research, a Ph.D.-like degree, and (3) register of research organizations, everything within a framework of a programming initially forecast in the years 1980-1981 and 1981-1982, and thereafter on a permanent quadrennial basis; thus the first plan should have covered 1982-1983 through 1985-1986. In the framework of the law there is a control provision that provides for a triennial check on the activities of university professors.

The system on the whole was supposed to start as an experiment effective from the academic year 1980-1981 through 1983-1984. At the end of this period the political authority had to be able to validate the conclusions of the performed work and to keep it fully operational.

As has often occurred in education policy in Italy, the structure did not hold up, evidenced by conclusions derived at a meeting held to summarily judge the situation at the end of the experimental period, presided over by the Minister of Education.[3] Several textual extracts state: "it is not possible to experiment with new curriculi or new courses" (L. Dadda, p.17); "while carrying out the experiments in the university, departmental organization themes have prevailed in respect to didactic innovation" (F. Falcucci, p.6); "we must take into account the 300 plus departments created, even though three-fourths of these are primarily created within the sphere of the faculties, with 40 percent of teachers involved in the various departments" (N. Delai, pp.27). The officials in charge thus declare that:

- no worthwhile didactic experimentation has been implemented;
- the only new organizational form, the department, has effected only a formal change within the old faculties framework (in other words only the label of the old institutes was changed);

- sixty percent of the teachers were unrelated to the half-hearted undertaking;

- under the circumstances, it is not possible to undertake serious experimentation.

The meeting's explicit declaration of failure within the experimental field was finally expressed as: "I hope that this conference could be considered as a premise to a 'great' didactic experimentation" (Dadda, p.9). In other words, the meeting that should have evaluated was deferred to the future. As far as the doctorate in research (Ph.D.) is concerned, its precipitous suspension after just one year of activity is less crucial than the total incongruity of the apparatus in respect to its goals and to the American derivation model.

It is significant that the immediate denaturization in respect to the basic philosophy of the doctorate institute, which should have had a narrow typology (10 types in the United States model), has suddenly expanded, though only formally, to some 225 disciplines for 488 courses.

Finally, in regard to the research registry that should have been the "Gotha Almanac" of the whole structure, its huge list (1,114 entries according to the census tabulation of the National Research Council (7/9/84), justifies its immediate degradation.

A brief analysis of the contents leads to the following observations:

- the internal enumerative imbalance: the NRC is viewed as one of the 1,114 agencies in the census, thereby on an equal footing with the numerous modest structures that can not be objectively correlated to it;

- the use of the register for purposes of access to financing by otherwise respectable industrial concerns thus, for instance, Fiat has lined up 8 research agencies, Agip 5, Ansaldo 6, Olivetti 5, Eni 3, Alfa 4, Breda 4;

- the enumeration of research agencies includes many agencies of dubious merit such as: Friends of Guarcino Association (Frosinone), Italian Center for Salesian Women's Works (Rome); Municipal Aquarium (Leghorn), Friends of the Archbishopric Library Association "A. Di Leo" (Brindisi), First Stage Eel Breeding Society (Sapsa) (Brescia), Ligurian Small Tube Manufacture, Management Center of Municipal Fisheries (Orbetello), Municipal Street Cleaning Agency of Milan, Specialists Battalion Nocera Inferiore, and Italian Women's Center (CIF) (Rome).

But even the utilization of preceding incentives reached a dead end. Just think of what has happened as a result of law No. 910 of 1969,

which permitted and still permits, along with the so-called liberalization of admission to university, an even more revolutionary freedom of makeshift study plans. The cultural hypothesis underlying the law of a sociologically advanced culture was that of breaking-up the hierarchy between fundamental courses and complementary ones; it permitted students to "tailor" their own educational programs, thus offering them a way of expressing creative originality. Finally, it endowed the faculties with the responsibility of decisions regarding the acceptance, rejection or orientation of student demand for a more advanced equilibrium between a required curriculum and continuing innovation. The experiment, although very original in terms of the challenge provided to students and faculties (more for the latter than the former since it was the teachers' duty to accustom the student to express his needs), must be considered a failure. The basic courses have made a resurgence (if ever they were in decline) and with it the stability of the central plot of academic power. It is not simply an Italian case. The OECD[4] complains that, "the experience of the countries that have attempted to modify the institutional structure of their higher education (countries different from each other like France, Sweden and the United Kingdom), show that these structures are remarkably resistant and that by the end of an apparent innovative period, they will often reemerge in another form. The universities . . . have a remarkable capacity to 'digest' reforms, perhaps because their temporal horizon is far-removed." However, in the Italian case, the convergence of aims occurred on two levels that are objectively dangerous: the detachment in the institution of the teaching chairs from the actual number of students (Italy is the only country where the number of teaching chairs increases while that of the students decreases) and the metastatic proliferation of courses offered. The most recent illustration of this can be found in an announcement *(Official Gazette* of 8/10/83) of competitive examinations for university chairs listing as many as 260 groups of disciplines subdivided into over 5,000 subjects.[5]

The type of structural evolution is, however, naturally connected to the social demand for university education. It is known that the explosion of this demand has occurred in the industrialized countries in phase with the postwar demographic and economic development, as its leveling or decline accompanies stagnation and or recession in the same sectors today. However, the responses have been different and correspondent to the various systems' apparatus. The most flexible (generally the Anglo-American and Nordic ones) have adapted with relative ease to the new requirements and to the growing number of consumers of a complex labor market. Those of Central-Southern Europe, more rigid and centralized, have either remodeled their structures (France, W. Germany) or have sought, as in the case of Italy, to enlarge supply by leaving models nearly unaltered. The most evident sign of this reproduction of existing structures is the institutional law of new universities

(8/14/82, No. 590), in which not one new faculty or graduate course is presented, reproducing unchanged the plot of the traditional structures (literature, education, science, medicine, engineering, law, political science, economics, business, agriculture, and sociology).

The most dynamic evolution of the quality of the Italian system took place in the 1960s, during which the only authentically new post-war structures were instituted, either legally or administratively. The process finds its most characteristic expression in the affirmation of new scientific sectors for Italy (sociology, psychology, informatics) and with the attempt to aggregate in differentiated forms the educational structures. The highest point of this change corresponds to the institution of the University of Calabria that, with a limited enrollment and with a residential character and original teaching contents, embodies the most significant example of such change.

It is also important to emphasize that this institutional redesign occurs through an internal stimulus. It is, in fact, the academic agencies that initiate new courses which are later recognized by the State, as in the case of the three previously-mentioned courses or entire graduate curricula (engineering, political science, architecture). However, when this process reaches a level of studies that involves the more solid vested interests, such as that of medicine, it stops. It is at the end of the 1960s, in fact, that the Italian Medical Academic entity redesigned the new medicine faculty after long debate. But at this point the political power withheld its approval, and with the beginning of the 1970s the entire reforming process was blocked. The reform of medical studies was approved in April 1986, according to the EEC guidelines. The already heavily nationalized Italian university then expanded the sphere of relevance of the public authority with the advent of the cited law No. 590/1982 that confirmed the competence of Parliament concerning the institution of new universities, or the government-parliamentary reserve for the institution of faculties or graduate courses.

This phenomenon, that the cited OECD document defines as "growing public influence on higher education," affects all Western countries and further reduces the influence of local and collateral institutional powers on academic knowledge and scientific research. Only in the United States is the dynamic more complex and ambiguous. No one there denies university dependence on the Federal Government, but the degree and conditions of this inevitable dependence, not the dependence itself, are considered to constitute the problem. This, however, affects the research programs more than the normal didactic operational conditions which, because of the private structure of American universities and the subsequent inter-university competition, remain substantially autonomous.

The mechanical reproduction of the structures within a framework of slow, and on the whole, marginal and not organic variations has been the

Italian response to the new social demand for education. It is a long-held, current opinion in Italy that this was unrestrained, excessive and impetuous. Thus it merits some observation, and the best examination of the problem can best be accompanied by an international comparison.

The "conformists" largely blame the law of the so-called "access liberalization" (9/10/69). The extension process was started in 1965--and this was the period of most concrete change--when graduates of technical schools were permitted to enroll in the universities. This is a fact of substantial social relevance, owed to the contribution of new energies to the domain of the bourgeois university. The subsequent liberalization allowed a greater horizontal mobility among faculties, obviously having highly positive justifications and consequences in regard to personal achievement and job placement.

As is known, the explosion took place and grew in the years 1970-80 (see tables 15a and 15b).

However, this explosion stabilized around the 1980s. While the number of enrolled students decreased, and still decrease, the number of students who failed to graduate in the prescribed period of years increased and continues to increase. This is a typical Italian phenomenon, denoting the system's pathology, an unjust discrepancy between a declining physiology and a growing pathology.

At this point the desired intervention should clearly be drastic to reduce the number of perpetual students outside of specific degree courses. Practically anyone can remain a student for life. The rule that permits a student's continued enrollment by taking one examination every eight years should be abolished. The freedom of enrollment that clearly belongs to the physiology of a university system which is not yet fully evolved should be enhanced. In fact, Italy in 1983 registered only 181 university students out of 10,000 inhabitants, being surpassed by Argentina with 187, France with 198, W. Germany with 188, Holland with 250, Belgium with 191, the USSR with 197; not to mention the U.S. level of 525 students (ISTAT, *Statistiche dell'Istruzione*, 1983, no. 7, pp. 97-98).

3.4.3. University Programming

The advent of university programming, discussed for 20 years and finally accepted by the rules of the 1980s has represented another missed opportunity for Italian political power. The first tool, the two year plan, was limited to the traditional distribution of teaching chairs and was clearly deficient in its effect on programming. It has nevertheless been claimed as having affected the pace of development of scientific knowledge by preordaining its speed, which varied with different sectors. Unlike the economists, the plan failed to consider that the development effect is never possible by using only one "pedal." Though

having conspicuous interest, the teaching chairs are only one variable, and often not the most important one. Thus, the project has not yet achieved the desired effect.

Let us now briefly analyze this typical Italian experience. In assigning a certain number of professorships to the Italian universities, the law provides for a program of development of the various scientific sectors divided into the following areas:

- blocked development;
- normal development;
- accelerated development; and
- impelled development.

In response to the public power's demand (such as that of the Minister for Scientific and Technological Research), it proposes to arrange didactics and research in well-determined fields such as telematics, marine technologies, material technology, food and agricultural technology, biotechnology, renewable energy resources, chemistry and space technology, information electronics, research for improvement of social services, and the strengthening of several technical services (geological, seismic, hydrometeorological, cartographical and pedological).

This was the first time that the Italian political power made a decisive choice and declared the following studies blocked: law, history, literature-linguistics, socio-anthropo-psychologies, philosophy, geography, and architecture. Those selected for slow development were veterinary medicine, medicine, mathematics, pharmacy, traditional engineering, geology, public law, didactics and pedagogy. Various other sectors picked for accelerated development were botany, zoology, agronomy, mathematics, aeronautics, various technologies, economics, statistics, engineering, and others. The four sectors selected for impelled development were industrial biochemistry, solid-state physics and chemistry and related technologies, informatics and related areas, and aerospace. Consequently, blocks of university professorships were distributed.

It should be immediately noted that this is the only operation of a definite programming nature applicable at a university level. At the same time, several critical points should be stated, to which political thought, though presently open, should respond.

By setting aside peripheral details, the weakest points of the measure appear to be:

- In view of the declared programming purpose (the decree starts by announcing itself as "a temporary two year plan that represents the first programmed intervention on the university" schedule by law), the tool used is totally inadequate and incongruous. "To consider" uni-

versity development in light of a programming process involves the organic whole of more coordinated factors (for example, investment and consumption expenses, building industry, various facilities, basic metabolism, research structures, various levels of personnel, and so forth) relative to which the simple assignment of regular posts is an important fraction that by itself is not resolutive. The absence of these addenda would stymie the programming intent and reduce the decree to a mere distribution of chairs (customary in the Italian system), classified according to implicit parameters of disciplinary preference;

- The Minister's indicated goals for scientific research would involve the incorporation of actual applied research programs unrelated to individual disciplines such as those connected to the distribution of tenured professorships. It should be more a matter of finalized projects, as those promoted by the NRC, than a matter of attainable objectives based on pure and simple chair assignment;

- The gap between the low areas of blocked and normal development and the high areas of accelerated and impelled reflects a professional-utilitarian valuation of current university activity in a certain culture of quasi-culture of ours. According to such a criterion, the development of the humanities disciplines, relegated to the first two areas should be limited, while that of first two areas, should be sustained. The technical-experimental sectors should be sustained. The political decision, however, was also late in addressing this situation because the big push given to the applicative sectors affected industrialized countries around the 1960s.

One may ask how many breakdowns in today's society are due to that imbalance. Now there is a tendency to a balanced progress of the various segments of the social consortium, in which the humanities have a decisive role (even though sometimes in the negative, distorted form of the persuasion to accept the non-human application of technological knowledge). The social transformations that took place between 1970-80--new local sovereignties, consensus requirements, role of soft and/or simple technologies, etc.--render less and less relevant the matter of industrialization, to which the package of privileged areas is targeted.

- Along these lines, a trace of wisdom was found in the Ministry's proposed demand for scientific and technical research expressed as the "research for improving social services." But sociology is blocked by the decree, as are philosophy, anthropology and psychology, namely all the troublesome disciplines. Instead, the international debate on these has heated up again. The OECD once again proposed, on the basis of advanced countries' experiences, university models that include,

for all curricula, "components" of literature and social sciences. At least two subjects of these disciplines should be included in whatever degree program is undertaken. The organization asserts that at the very least it serves as a means to acquire a certain relative sense of the different areas of knowledge, aiding one to avoid the pre-Copernican mentality, that of placing one's own specialization at the center the intellectual universe. While in Italy an attempt is being made to block, by decree, the humanistic sectors of science (but can one prevent a man from thinking? This was attempted in the past against Gramsci), elsewhere there has been an orientation toward "combined diplomas" that pair professional training with a significant social and human education and, conversely, include in the latter at least 20 percent technical specialization. Furthermore, neither the desired impelled sectors nor those designated as slow have shown an increased pace.

Perhaps the very idea of the government's university program has arrived late. Earlier we cited the twentieth anniversary of its incubation. There was probably a determined emphasis on the "experimental" in the 1960s, keeping in step with certain stages of industrial development that were then in progress in the country. Back the, nothing of the kind was attempted organically. Only the physicists thought to program their development in an organic manner, a reflection of international trends, but found it hard to give a complete meaning to their work, appearing like skyscrapers amidst lower class houses. For the rest, the course has been stochastic, and the overproduction in the 1950's of geophysicists who later couldn't find work in their field still signals a warning of danger of colossal mistakes. Today's situation is different.

It is not enough to give priority to the experimental (and which course to follow, then, with what certainties or at least high probabilities?).

A mixture of human and social sciences with the natural and exact ones seems necessary to avoid the rigid compartmentalization of disciplines, and to guarantee these margins of flexibility that permit the avoidance of what paradoxically occurs today. In fact, we are witnessing a process of de-specialization enacted by firms in regards to newly-hired personnel.

It often happens that before fully inserting the neo-graduate into the productive processes, a firm finds it useful to put him through additional, nonspecialized training that is not more in-depth in relation to his chosen field of study, but a despecialization from that particular discipline in favor of a more widespread and horizontal preparation. A chemist must therefore be partially "dechemicalized" to insure that some relevant part of his specific training is reoriented toward sociological, economic, legislative and psychological aspects.

still pertaining to the work he is assigned to carry out. The fact that this type of integration should be undertaken by firms subsequent to the university education (which by its own definition should mean multi-faceted knowledge) seems an incredible paradox. On the other hand, unquestioned authorities, like A. Momigliano[6], warn us that from their international vantage point, "Italy is particularly weak in historical, linguistic, and more generally, social knowledge, than the surrounding world."

In effect, the game is thus more complex and less clear. The surprising coincidences in modern Italy, a nation of so many opposites, such as stagnation and growth, production and productivity coupled with fewer workers, an increased number of paupers versus the surge of new needs, necessitates not only different responses from the university, but also different alphabets.

The Italian "athenaeums" instead continue to package lawyers, doctors, administrators and teachers (this is the bulk of their product) for professions no longer existing: we send astronauts toward stars that have disappeared ages ago though their sallow wake is still visible.

The discussion returns to the ethics of participation. It influenced an era and not just the university. It was a generous attempt of a new way of "being social," a substantial transfer of political power from the top to the grass roots. In the end it was a failure, at least if compared to expectations translated perhaps into laws. Today one hears the term "cold participation," which is a plan of co-powers remaining unaccomplished. A "warm participation" is truly needed. There is a need for a significant mobilization based on a collective project. In Italy, it may be useful to encourage a dispute in the French style between promoters of different hypotheses of aggregation of scholastic power, as really occurred in the "querelle" between the private and public schools in France; except warm participation is hard to determine, and its course seems to follow more the collective irrational than the typical Spinozan geometries of Italy's and other countries' standards.

The last act, the "Plan of Development of the Italian University for the Academic Years 1984-1986: The Proposals", is really the last act of a decomposition process--no planned philosophy; a critical collection of often strange suggestions (for example, the university of Ferrara offers a degree in cosmetology, that of Chieti offers one in Adriatic culture, that of Udine offers wood engineering); total absence of financial implications and of any other type of resource; inevitably the National University Council pronounced judgment (April 11, 1985 Act No. 876) on the plan in question relative to the academic years 1984-85, defining it non-existent ("the prearrangement and the actualization of a completely operative program for the quadrennial 1982-86 was not evidently possible"), and invited the Ministry to address the next quadrennial plan (1986-90).

At this point, it is politically exigent to "return to the drawing table." Several conclusive points of reference for a possible university policy in coming years can be listed as follows:

- a map of human and financial needs;
- autonomous modality of allocation and utilization of funds;
- maximum dimensions of university structures and karyokinesis of the model;
- auto-organizational powers of the university (teacher selection, salary levels, national and local careers);
- autonomy of the university bureaucratic apparatus;
- design of university linked to the regional needs;
- deregulation of faculty degree courses;
- de-indexing of the didactic order;
- de-indexing of research doctorates; and
- absolute research autonomy (alternative sources of financing; outside research) but equally absolute and rigorously substantial verification of results.

3.4.4. The Antecedent and the Fact

To think in terms of a uniform post-compulsory education implies the necessity to reconsider everything from top to bottom, even presupposing the utilization, for the possible scholastic paths in the future 20 years, of past-present materials. A preliminary observation advanced by Gwyn[7], can be shared at this point. The radical nature of scholastic change that we observe has an illustrious historic precedent, that of the first industrial revolutions (the two revolutions, the one dating two hundred years ago and the present one, are by no means identical, but are certainly comparable).

One notes, first of all, an element of dissonance between them. The Anglo-European revolution of 1700 did not seem to have, as opposed to today's informatics revolution, immediate direct and conscious effects on the education system; instead, today, there is general agreement that even after some false starts, the information phenomenon is already distorting the status quo of the school. Other elements tend, instead, to demonstrate consonance among the two revolutions, such as the assumed centrality of educational processes and the resulting culture that is their product[8].

Another element is the subsequent creation of an autonomous policy for school and culture regarding the scholastic phenomenon as the backbone of collective life (one does not hereby wish to revive the concept of school as a club for the ruling class, as was the case until 1700). Another element is increased demand for skilled workers seeking more advantageous economic positions. Still others are the creation of new professions and the decline of others, the pervasiveness of the

educational network, its fallout on the production and distribution of wealth and its effect of widespread social mobility.

These are the constants of the past two hundred years of the education-research system in the collective life of the Western world.

If one considers the deep dissatisfaction mentioned above in the inadequacy that still characterizes today, as in the past, the education system of the industrial and information societies, the analogy can be considered complete.

However, it ends here. It is an antecedent that paves the way for the fact; but it is a path still untrodden.

3.4.5. Hypothetic Scheme for the Post-Compulsory Stage: The Firm "16-24"

With this expression one intends to express not only the exigency of conceptual and operative unity of the post-compulsory age group (i.e., the ages 16-24), but also the need for productive autonomy, in a wide sense, of the related educational structure. In other words, we seem to have returned to a precapitalist and a prerenaissance function of the school. The educational locus, as the "art shop" of bygone days, returns to being the producer of skills and, simultaneously, economic goods. In the "firm 16-24," experiments are no longer "simulated" (like in the run-down physics and chemistry laboratories of schools of the past which still survive), but experiences and activities are employed to produce wealth. The agrarian technical institute or the professional hotel institute, the CERN of Geneva or a university clinic, produce (or are capable of producing) skills, economic goods and culture. If they still don't, they are in a good position to do so. In any event, the future organization of the "firm 16-24" should be redesigned from this perspective. Other opportunities, for example non-working time or the so-called pure research, should be integrated in the new system.

And what are, or will have to be the additions to this new system? At this point an apparent paradox must be faced. Western European societies are largely defined as working societies.[9] However, they bring about grave underemployment conditions, jobs that do not correspond with the diploma received and acute youth unemployment. The "firm 16-24" should internally and partially resolve this contradiction and structure itself in order to offer a job-training continuum. To achieve this it is necessary that it internally reconverts itself from the "working life" perspective. Under this profile new social functions are to be reflected in the educational panorama by intersecting and modifying the traditional ones. De Corte has thus schematized the relation between new or renovated social roles and the educational curricula.[9 10]

Social Roles	Curricula
Citizen	Political and Juridic Education
Information User	Informatics
Nature User	Ecology
Producer	Social Education
Consumer	Consumer Behavior Education
"Partenaire"	Sexual and Sentimental Education
Cosmopolitan	International Education

These are new approaches that are associated with a new network. Today we feel a cultural event is a connotation of its capacity to produce an interpretation of the world and by its means to change it. This event's means of guiding are the traditional scientific thought and the nonscientific methods of approaching reality. A thin thread connects these two factors. The new, so-called progressive character of science, which is given to us by all contemporary epistemology, makes of science a cultural product, such that in it one identifies product and process through a popperian circle of constructions and ruins. If science becomes such an historically and socially determined and temporary practice, it can be joined to non-scientific thought (that which E. Sabato calls "magical thought"), finding itself again in tune with all intuitional activities: after all, only these face the problem of the tragedy of life.

3.5. A New Model for the University

Between 1950-1980, while rapid and radical changes took place elsewhere, the Italian university registered such a slow pace of renewal that we are reminded of that Gallic river about which Caesar wrote, which flowed so slowly that one could not determine in which direction it flowed.

The result is a general framework that is densely traditionalist. One could so define the double negative effect of the evolutionary slowness characteristic of the educational institutions (let's not forget that human communities insure their survival through this primary means), and that induced by a desired slowdown.

Another consideration should be added to fully appreciate the picture. Pre-war Italian society became widely fascist only around the 1930s.

Until then the institutions were of a liberal bent (the very governing bureaucracy, until those years, was formed before fascism, likewise the post-war one, of lictorian formation, ruled at least until the early 1960s).

It is not a coincidence that the basic law on the university (the famous unified text of 1933, completed in 1935) dates back to that time period.

In respect to the above-mentioned double negative effect, the central body of laws that, by right and by fact, govern the Italian university, is still the same today and limits itself to the 1980s legislation, constituting an accessory to that principal order.

Still today the public education ministers from time to time provide explicit "instructions for use" of the universities, without mentioning the availability of funds that render the universities appendices of the Ministry, or of the wide, minute and ever-restrictive rules. The extent of this dependence is not restricted only to the fact that university officials receive and process the messages from a central authority, thus picking up the transfer alibi on the power of university disfunctions, but also to the attitude of skepticism that generally accompanies every hypothesis of radical change. Around the 1950s, C.L. Ragghianti listed in a decalogue (or better, a pentalogue) about fifty resolutive powers attributed by law to the Ministry for governing the university. Since then the picture has not changed much. In this way, the "load-bearing" structure of our university is nearer to the centralized model for the Catholic countries than to the Anglo-Saxon ones, with which, however, we enjoy the greatest exchange of scientific "traffic."

A university policy must take into account these actual conditions. But if it has to be a policy, it must also have the audacity to design possible fundamental changes. And such changes are definitely possible.

The direction of the new developments should naturally be related to international events. But the foreign coupling with the specifics of the Italian situation should be closely defined by identifying the basic tenets of our development process and of our history.

The experience accumulated from past years reinforces, as one has already seen, the hypothesis of the impracticalities relative to the mechanical transposition of Anglo-Saxon models (department, research doctorate) into our academic apparatus.

To propose a model, however, one must first ask a basic question, namely for which university is the model being proposed.

So that the design is not arbitrary, it is necessary to place it under previously defined actual conditions. But it must also have an ability to change, enabling the substantial modification of the state of things, and in this way stimulating an eager and effective participation.

The first segment of this discussion calls for reflection. The "culture-setup" assumes in this contemporary world several fundamental connotations that render it at once recognizable and acceptable. The simplest case (though very complicated in some ways) is the "form-culture" in countries of the so-called real socialism.

It is included, as we all know, in a unitary model, clearly defined and often perceived beforehand. But also in the Western countries the form-culture is accepted only if it falls under a few models, that, by

being more than one, yet not many, while offering articulated routes, force the cultural production into very narrow channels.

Hence, here one rediscovers the central role of the university. In it the culture-setup must easily find its structural reservoir, whatever its features. University culture must be put forward as "otherdom."

Certain societies of our time crudely stamp out disagreement; others weaken it. It is a question of seeing (this political valency of the university is essential) whether it is possible for a university to use dissent as its raison d'etre, transforming it into a permanent source of divergence.

If one chooses this route, the picture becomes clear. Of course, as in the universities of mono- or oligocultural societies, even in the new proposed model, two typical orders must be maintained: the transmission of cultural heritage and the aggregate of existing professions.

But, once these parameters are assured, new ones must be guaranteed, claiming for the university community the right or putting itself in order in an autonomous fashion.

The consequences of this hypothesis are far reaching.

The first and most striking is the cutting of the umbilical cord with national political power.

The university will have to emerge, according to this desired tendency, as an autonomous community of scholars to which the State will provide some primary social functions, as already described (transmitted knowledge and professions), and funds; in other words, ministerial contributions.

But, above all, it will have to elaborate new and alternative knowledge, conceive of forms of social alternatives, mediate between itself and the whole framework of institutions on international, national and local levels.

On a practical level, this represents the end of the ministerial system of fund allocation mediated by an independent structure with a plurality of opinions such as the British University Grants Committee. As in the United Kingdom, the control power exercised by the body of inspectors is not a function of the Education Ministry, but of a vaster and more orderly state community (not to mention the universities, which are wholly autonomous); the university counterpart as a whole will have to be, according to this hypothesis, not only the government, but a higher authority, although obviously connected to the government. One can imagine an autonomous system such as the Italian Magistrates' Superior Council, presided over by the President of the Republic. The research function is certainly no less fundamental than the judiciary function, designed, after all, not to mold the future, but to preserve social order.

For the rest, the university must accept the challenge of its autonomy. If we cut the docking rope, the result is open sea. Thus, no more national rosters, convenient niches, nor fictitious nationwide

examinations, but a choice by the various scientific communities and deregulated retribution scales.

In this framework, it is not possible to ignore a substantial danger, revealed by Eric Jantsh,[11] namely the mercenary university, which is forced to aggressively dominate the local economic and political power in order to survive.

It was said to be a high risk, but at the same time, a proper balance with it is assured by a basic metabolism backed by the state's budget. On the other hand, every university will discover its individuality and its culture levels by jumping into the competition.

In any event, the present system that equates reality and dignity in terms of form, and that is substantially different from substance, is definitely more dangerous and unfair.

In this way a few major current university problems, such as those of size and cultural content, can be alleviated.

A preliminary general discussion that provides the background to the subject is that of the course of demographic trends. The European picture presents a future situation of decline.

In fact, to a progressive increase in population as a whole there corresponds an equally progressive decrease in births. The decrease in birth rates and the related aging of the population are data common to almost all European countries.

The demographic forecasts for Italy for the year2001, carried out by ISTAT, indicate that even our country is nearing a zero growth condition.

On the other hand, the fluctuating course of birth rates determine the formation of "surplus" generations or "undersized" generations relative to the historic trend. This latter factor also has an effect on education and, consequently, employment. The fluctuations of birth rates relative to the historic birth series indicate that in Italy, between 1959 and 1976, there were 1.7 million "extra" births, while from 1977 to 2001 there will be 1 million "short" births relative to the constant line of the trend.[12] Thus, those born between the 1960s and the first half of the 1970s constitute what has been called the "surplus generation," the twenty year olds who today are entering the labor market. They will always find themselves "too many," oversized in relation to preceding generations.

One wonders about the impact of this surplus generation on the number of diploma holders, and thus consequently also on scientific employment in our country. As this "dense" generation continues to graduate from now until 1995, it will find added difficulties in the education field first, and later when entering the labor market. A policy of university enrollment limitation must thus be evaluated with such a perspective. University size must be made to correspond to its real function. The degeneration of the monster-university, whose classes are infrequently

attended, must be quickly corrected. Beyond a maximum threshold of 30-40,000 pupils the model should be closed and then repeated.

This would also serve to de-dramatize the huge political problem concerning access liberalization, an incalculable social benefit of offering the necessary support to all those who qualify to matriculate at the university (bear in mind that a strict selection process is already in effect before matriculating, during coursework, and at graduation).

The concurrence of external forces in the country, in a narrow sense--regions, local agencies, economic and productive structures--can be crucial in articulating a conclusively rational utilization of human capital in the universities.

We certainly must reject a situation of exaggerated enrollment, with classrooms that are either underutilized or overcrowded so that teachers can't teach well because of too many or too few students. Thus, priority must be given to the size of universities and classes, to attendance for the various courses, and to a free alternative selection of courses offered without a predetermined attendance requirement.

The intervention in the sector of the contents is another qualifying aspect of the whole. Even here an ideological background must be promptly dealt with. Presently, the Ministry of Public Education and the President of the Republic determine the necessary form of the cultural contents suggested by the faculties. This does not make sense. Only the scientific community can establish what should be studied. Whoever has frequent contact with the academic world knows how difficult it is to give an orderly shape to disciplines that by their nature spring up uninterrupted like tropical vegetation.

Their velocity of regeneration reaches ever accelerated values. Just to take one example, it has been calculated that the stock of bio-engineering knowledge and its applications has doubled (until 1983) every 24 months,[13] and one can reasonably assume that this growth, though just in this defined field, will follow at a faster pace.

The problem of the so-called legal value of diplomas is a false one, since it has already been resolved by the unified law of 1933. Everyone agrees that the cultural moments of the scientific and professional "ensemble" should be distinguished and approved in diverse centers.

The Italian constitution, on the other hand, permits substantial methods of ascertaining professional skills related to knowledge, which, being at a university level, must have a background of innovative capacities beyond techniques.

3.6. National Education Levels

In the process of compiling the October 1981 census data, ISTAT released the results of a sample covering two percent of the Italian population.

Although it is rough data, it provides significant evidence of the country's education levels. We must briefly follow the course of the tight relationship between the picture of cultural leadership and the milieu which it governs. Great changes have occurred, resulting in a higher profile in Italy, even if in the meantime competing societies have sped up their pace, (thus ultimately pushing us to move further ahead). It is true that in Italy, we have a higher number of illiterate (3.0 percent) than college graduates (2.7 percent). But utter illiteracy is a phenomenon of the past (table 16).

Among Italians six years and older, 2.8 percent (about a million and a half people) are considered illiterate; however, more than a million are 55 or older. They belong to the "third age group," a waning, outdated heritage that is leaving the production circuit. Among the 20-24 age group only four out of a thousand are functionally illiterate, according to Unesco's ranking.

This new situation brings Italy close to the rest of the industrial countries. Unesco, in fact, estimates the illiteracy rate to be 2.5 percent in developed countries. This country's cultural blindness, typical of the south, by now belongs to history.

Table 17 shows both the illiterate and the literate groups rather than just the former, because of the reason mentioned above. The subject of the old-fashioned illiteracy is by now almost incidental. It seems more fair to link the two phenomena as it is done in the evolved countries.

An "illiterate" is someone whose reading and/or writing ability is limited and who lacks the minimum degree of knowledge that enables him to communicate in today's world--like reading a poster or a newspaper, filling in a simple form, or summarizing a brief passage. This is Unesco's definition of a "functional" illiterate.

In ISTAT's table one finds the "illiterate" as a synthesis of absolute and relative cultural blindness.

It must immediately be added that, because of the world's complexity and its contemporary challenges, this social group reflects, if perhaps in a deteriorating manner, the plague of the old illiteracy.

Among those 15 years and older (approximation is necessary to avoid the inclusion of pupils of compulsory school) these illiterates number about seven million. Two-thirds are over 55 years old. Under 44 years old they number about one million, a large but no longer alarming group.

To depict the country's cultural-educational situation, ISTAT takes into consideration the population data of those six years and older. It is a normal custom that enables comparisons between the census decades. They are shown in table 18: presently 20 percent of the population is of school-age, 42 percent does not finish compulsory school and 38 percent conforms to the constitutional dictate of a minimum of 8 years of schooling.

Compared to the censuses of 1961 and 1971, the situation is no longer alarming, even though it is unsatisfactory.

In 20 years, the percentage of those who have completed compulsory schooling has more than doubled, from 15 percent to 38 percent.

In 1961, not more than 15 percent of Italians over six years of age were in compliance with the constitutional rule. In 1984 this number jumped to 38 percent. In this percentage, in terms of absolute numbers, are included as many as twenty million Italians. It is a sign of the consequences of a mass mobilization involving students, teachers, financial obligation, the building sector, and equipment. Even amidst delays, inadequacies, and contradictions it has resulted in a new and different country today, in many aspects. Certainly it is the effect of industrialization, but also it is due to the change in the country's political leadership, beginning with the center-left coalition of the 1960s. Today we record only the effects, but the history still must be written. However, the data in table 18 is much too synthetic. It is necessary to make a more minute analysis of the age groups to better understand the situation.

Table 19 shows "Italian diploma distribution" between the ages of 25 and 44.

This is the core of the active population and its rate jumps from 38 percent to 52 percent; over 50 percent of productive Italians have at least a junior high school degree. Six percent are college graduates, almost 20 percent have an upper secondary school diploma. Forty-eight percent have an elementary school degree.

Further ahead, in the 20-24 age group, junior and high school graduates are over 80 percent. We are now seeing a different country, largely unknown until now.

However, on a social level, the overall picture is not as bright as it may seem from these observations. Table 20 shows, for example, that out of the total active population, two thirds of the unemployed and the young seeking first employment are graduates of junior and upper secondary school as well as college.

This is the reservoir of social malaise upon which political attention must be placed.

In effect, the higher the overall level of human aggregates, the more complicated and dense are the problems, requiring political answers involving more innovation and initiative. If, instead, we consider the expenditure aspect and the commitment that our collectivity has made and still makes to the school system, then alarm is justified. Table 21 shows how the public education budget has declined a good three points in real terms in 1984. The year 1985 shows a climb that nevertheless should not be misinterpreted--it is the monetary mass of salaries that grows.

Alongside the hardness and viscosity of political mediation there stands, however, a new country with some old ailments, but of a dif-

ferent and sometimes unexpected quality. Of course, the problems are also different, more harsh and less understandable. Like the aftermath of the old maladies of underdevelopment, which bring to mind the epidemics of by-gone illiteracy, there has been a shift to today's more sophisticated diseases (neuroses, tumors, cardiopathology), such that the new illiteracies assail us in a covert, subtle, and more destructive manner. Herein lies the challenge.

3.7. Some Conclusions

It is useful to reiterate that the aim of this document was not and is not that of forecasting or predicting, but rather one of following the course of several major social aggregates of our time (a course that, as a sum of innumerable daily transactions, seems unexpected and unprogrammable, as past experience teaches us), and of indicating several possible on-course corrections (the "soft lever") toward more desirable evolutions. In this framework, the fundamental socio-economic trends seem to be at variance. There will be both more rich and more poor people together in our society, as we already see today with respect to the recent past.

In the U.S. (Haward, 1985) during the past five years, the number of poor people has regularly increased (today they number 35.5 million or 15.2 percent of the population) as has the number of the super rich. In 1984, they numbered 832,602, a large majority being college graduates (Thomas Stanley, University of Georgia).

But we shall also have another polarizing effect, namely more educated people and, on the other hand, more people largely deprived of cultural functions. It will be necessary to guarantee everyone a minimum patrimony of knowledge and a set of abilities that enable anyone to positively react to the challenge of "new literacy": this hinges on two principal capacities, that of decodifying messages that inundate us daily, and that of making correct decisions quickly. As the upper level of competencies increases and widens, the gap will broaden for those who occupy the lower rungs of the ladder--there are bound to be more highly sophisticated jobs and more repetitious, low level jobs.

The attempts to correct the course range from the dissemination of discriminating learning to the supply of a large amount of information on daily events; to the establishment of new values, notably "conviviality," as a search for ourselves in others, and to "interwoven tertiarization" in the working world. In any case, it is indispensable to have a conscious "world vision," whatever that may be. The work-value will change. From "work to live" there will be a shift to "work to be." Moreover, as violence and tension increase, likewise there will be a growth of the ideal of a modest but secure daily life.

"The fundamental educational objectives, i.e. to take care of good citizens and productive workers, will not significantly change from advanced technology. Everyone will have to develop strong abilities of analysis, expression, communication and information, as well as wide knowledge of political, economic and cultural institutions. They are the abilities and attitudes necessary to understand daily reality and permit access to the best opportunities" (Rumberger and Levin, op. cit. pp. 206-212). Perhaps we are once more at "kalon" of the ancient Hellenism.

Hypernational and neighborhood values will emerge. A European ideal may be that of living at home as foreigners, abroad as citizens.

This is an achievement, with respect to thirty years ago. It is not much perhaps, even if in very diverse contexts, relative to the European Middle Ages.

This is the state of the art, together with an attempt to understand from which direction the wind will blow; but also to understand beforehand where we want to go, because if we don't know, as Plato warned in his day, the favorable winds will blow in vain.

References

[1] Dedicated to this subject are several works by OECD, summarized in "La cruise actuel de l'enseignment," Ceri ED (84)3, Paris, 1984.

[2] See S. Avveduto, *La Societa Scientifica*, Etas Kompass, Milan, 1968.

[3] Meeting on the "organizational and didactic experimentation in the university, Pisa, 1984, Acts on Universitas, year V, April-June 1984. the text citations refer to the textual interventions of the relative authors. In the later-indicated line the proposed law of Fiandrotti, Fincato and others is advanced (House of Representatives, act n. 2573 of 2/20/85); see, further, S. Avveduto and S. Soldatini, L'Universita Italiana nel Quadro Internazionale, Euridyce, 83, I.E.I., Rome, 1984.

[4] See OECD, *La Reforme des Etudes*, cit., duplicated, Paris, 1981, p. 22.

[5] Important is a fragmentation, even language-wise, which does not need any further comment: p. 9 of cited Official Gazette: The History of North-America vs. North American History; The Italian and Foreign Scholastic Law vs. Italian School Law and Comparative Law, (p. 6); Asian History and Institutions vs. History and Institutions of the Asian Countries (p. 10). And so on.

[6] Arnaldo Momigliano: signed letter to S. Avveduto.

[7] Rhys Gwyn, *The pedagogic aspects of the introduction of new technologies of information and consequences on teacher training*, typewritten text, EEC conference "The Training of Teachers," Bologna, May 7-10, 1985.

[8] This is repeated in the essay of R. Tisato, "L'Importanza del Problema Educativo nel Mondo Contemporaneo," in L. Geymonat, *Storia del Pensiero Filosofico e Scientifico*, vol. IX, 11 Novecento (3), Garzanti, Milan, 1977.

[9] Prof. De Corte, *L'Education et la formation des jeunes de 16 a 19 ans*, Conseil de l'Europe, Strasbourg, 1985) sets at 26 percent the young unemployed over 25 years of the total working population in the industrialized countries. In four of them it is over 33 percent: Hollan 35 percent, Italy and Denmark 34 percent, Belgium 33 percent. The same, sets at 85,723 total life work hours per person, that is, barely 7 percent of the average life, assuming a life of 75 years and thus equal to 657,000 hours starting at 18 years with a weekly work schedule of 38 hours, 4 weeks of vacation per year and retirement at age 65.

[10] Op. cit., p. 23 with some changes and the addition of the juridical preparation.

[11] E. Jantsh, *Integration plans of related systems of society and technology. The pre-eminent function of the university*, MIT, Cambridge (Mass.), 1969.

[12] See G. Agnelli-Futurama Foundation, 1991-2001, *(Demografia e mercato del lavoro in Italia e in Piemonte) Demography and Labor Market in Italy and Piedmont*, Turin, 1984.

[13] G. Heden, *Biotechnology Now and in the Future*, report to the Unesco Workshop on Long Range Scientific Forecasting, Rome, April 27-29, 1983.

Tables

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Table 1. Employment Structure in Italy 1974-1983

(in thousands)

	1974	1975	1976	1977	1978
Agriculture	3,412	3,274	3,244	3,149	3,090
Industry	7,639	7,668	7,565	7,667	7,633
Other Activities	8,550	8,773	9,049	9,247	9,436
Total Work Force Employed	19,601	19,715	19,858	20,062	20,159

	1979	1980	1981	1982	1983
Agriculture	3,011	2,924	2,759	2,545	2,543
Industry	7,646	7,772	7,721	7,598	7,408
Other Activities	9,719	9,978	10,265	10,535	10,753
Total Work Force Employed	20,377	20,674	20,751	20,678	20,704

Source: Istat (see note 2f, chapter 2)

Table 2. Employed Researchers Out of Total Work Force

(per thousand)

Countries	1973	1981
United States	5.8	6.2
Japan	4.5	6.9
Germany	3.2	4.7
France	2.7	3.7
United Kingdom	3.1*	4.0**
Holland	2.5	3.6
Sweden	3.0	3.5
Italy	1.7	2.3

* 1975
** 1979

Source: OECD, International Statistical Year, 1984.

Table A. Basic Economic Data of Some OECD Countries

	FRG	USA	France	Italy	Japan	UK
Working Population (*in millions*)	27.4	113.2	23.2	23.1	58.8	26.7
Unemployment *(% working pop.)*	8.1	7.4	8.9	10.1	2.7	13.2
Employment						
Agric.	5.6	3.4	8.1	12.4	9.3	2.7
Ind.	42.0	28.0	33.8	36.1	34.8	33.6
Serv.	52.4	68.5	58.1	51.5	56.0	63.8
GNP	10.6	13.9	9.5	6.2	9.6	8.0
Educ. Expenses *(as % of GNP 82)*	4.7	5.8	3.4	5.0	5.1	5.6
R&D as % of GNP	2.6	2.7	2.1	1.2	2.5	2.3

Source: Observ. OECD, n. 133, 1985 (data through 1983).

Table 3. Product, Labor Cost and Distribution Share 1973/83 in the U.S. and EEC

(index 1973 = 100)

USA

Years	Added Value (1)	Employed (2)	Productivity (3)=(1)/(2)	Real Labor Cost (4)	Real Wage Gap (5)=(4)/(3)
Manufacturing Industry					
1973	100.0	100.0	100.0	100.0	100.0
1983	110.6	93.8	117.8	121.6	103.2
Services destined for sale					
1973	100.0	100.0	100.0	100.0	100.0
1981	130.3	126.2	103.3	105.3	102.0

EEC

Manufacturing Industry					
1973	100.0	100.0	100.0	100.0	100.0
1983	107.6	81.1	132.7	147.0	110.8
Services destined for sale					
1973	100.0	100.0	100.0	100.0	100.0
1982	124.0	107.2	115.7	127.5	110.2

Source: Bank of Italy elaborations on Eurostat data, OECD and Survey of Current Business

Table 4. Unemployment in Some OECD Countries 1970-1983

(in thousands)

	Unemployed 1970	1975	% Increase 1975/1970	1980	% Increase 1980/1970
Switzerland	--	10	1,000	6	600
Denmark	17	121	612	164	865
Holland	45	260	477	326	624
West Germany	149	1,074	621	889	497
Belgium	69	168	143	311	351
Norway	12	40	233	33	175
England	555	838	51	1,513	173
France	510	902	77	1,452	185
Canada	476	690	45	867	82
Japan	590	1,000	69	1,140	93
United States	4,093	7,929	94	7,637	87
Sweden	59	67	14	86	46
Italy	1,111	1,230	11	1,698	53

	1982	%Increase 1982/1970	1983	% Increase 1983/1970
Switzerland	13	1,300	26	2,600
Denmark	290	1,606	312	1,735
Holland	655	1,355	801	1,680
West Germany	1,833	1,130	2,258	1,415
Belgium	465	574	514	645
Norway	52	333	67	458
England	2,770	399	2,984	438
France	1,863	265	1,864	265
Canada	1,314	176	1,448	204
Japan	1,360	131	1,560	164
United States	10,678	161	10,717	162
Sweden	137	132	151	156
Italy	2,068	86	2,278	105
				771.3

Source: Observateur de l'OECD, 1984 (elaboration)
(see notes on next page)

Notes to Table 4

The analysis relative to the increase of unemployment in 13 countries from 1970 to 1983 suggests the following conclusions:

1. Between 1970 and 1983 in all the countries examined the increase of unemployment ranges from a maximum of 2600 percent in Switzerland to a minimum of 50 percent in Italy. it should be noted that Italy started from the highest minimum among the four major European countries (West Germany, France and the United Kingdom). The average increase was 771 percent.

2. In each of the years considered (1975, 1980, 1982 and 1983) a progressive increase was recorded with respect to the 1970 base year: this occurred in all the countries with a sole exception, verified in 1980, of a slight decline in respect to 1975 in West Germany, the United States, Switzerland and Norway; in these countries from 1982 onward, the rate of increase of unemployment resumed.

3. If one takes into consideration the four European countries with almost equivalent population (West Germany, France, England, Italy) one notes a steady increase in absolute values for all the countries and for each period with respect to successive periods, with the exception of the 1975-80 period for West Germany.

The percentage increases from period to period are as follows:

Percentage of Increase or Decrease of Unemployment

	1975/1970	1980/1975	1982/1980	1983/1982	1983/1970
West Germany	+621%	-83%	+106%	+23%	+1.415%
France	+77%	+61%	+28%	---	+265%
England	+51%	+81%	+83%	+8%	+437%
Italy	+11%	+38%	+22%	+10%	+105%

(end of the footnotes to table 4)

Table 5. Percentage of Activity in the Seven Most Industrialized Countries (1970-82)

	Canada	France	Germany	Japan	Italy	United Kingdom	United States
1970	39.9	42.2	44.2	49.7	39.5	45.6	41.9
1971	40.5	42.1	44.0	49.5	39.3	45.2	42.0
1972	41.2	42.0	43.8	49.0	38.7	45.2	42.6
1973	42.5	42.2	43.9	49.0	38.8	45.7	43.3
1974	43.5	42.2	43.7	48.2	38.7	45.8	44.0
1975	44.3	42.1	43.5	47.7	38.8	46.2	44.4
1976	44.7	42.4	43.3	47.7	39.2	46.6	45.1
1977	45.4	42.8	43.3	47.9	39.6	46.9	45.9
1978	46.6	43.0	43.5	48.1	39.7	47.1	46.9
1979	47.5	43.1	43.5	48.3	40.2	47.5	47.6
1980	48.2	43.1	44.2	48.4	40.6	47.7	47.9
1981	48.9	43.0	44.4	48.5	41.0	47.2	48.2
1982	48.8	43.1	44.6	48.6	40.9	47.0	48.2

Source: OECD

Table 6. Employment Growth in the U.S. in Most Rapidly Developing Sectors

	Employment (in thousands) 1978	1990	% Increase	Added Jobs (in thousands)	% on all Employment
a. Most Rapid Relative Increase					
1. Calculator Operators	63	156	148	93	0.4
2. Paralegals	28	66	132	38	0.2
3. System Analysts	185	384	108	199	0.9
4. Computer Operators	169	317	88	148	0.7
5. Office Machine Operators	49	89	81	40	0.2
Sub Total	494	1.012	105	518	2.4
b. Most Rapid Absolute Increase					
1. Custodians and Janitors	2,585	3.257	26	672	3.1
2. Nurse Aids	1,089	1.683	55	594	2.7
3. Retailers	2.771	3.362	21	591	2.7
4. Cashiers	1.501	2.046	36	545	2.5
5. Waiters/Waitresses	1.539	2.071	35	532	2.4
Sub Total	9.485	12.419	31	2.934	13.3
Total	97.610	119.590	23	21.980	100.00

Source: Levin, Rumberger, op. cit. p. 212.

Table 7. Forty Occupations with Largest Job Growth 1982-95

Occupation	Change in Total Employment (in thousands)	Percent of Job Growth	Percent Change
Building custodians	7789	3.0	27.5
Cashiers	744	2.9	47.4
Secretaries	719	2.8	29.5
General clerks, office	696	2.7	29.6
Salesclerks	685	2.7	23.5
Nurses, registered	642	2.5	48.9
Waiters and waitresses	562	2.2	33.8
Teachers, kindergarten and elementary	511	2.0	37.4
Truckdrivers	425	1.7	26.5
Nursing aides and orderlies	423	1.7	34.8
Sales representatives, technical	386	1.5	29.3
Accountants and auditors	344	1.3	40.2
Automotive mechanics	324	1.3	38.3
Supervisors of blue-collar workers	319	1.2	26.6
Kitchen helpers	305	1.2	35.9
Guards and doorkeepers	300	1.2	47.3
Food preparation and service workers, fast food restaurants	297	1.2	36.7
Managers, store	292	1.1	30.1
Carpenters	247	1.0	28.6
Electrical and electronic technicians	222	.9	60.7
Licensed practical nurses	220	.9	37.1
Computer systems analysts	217	.8	85.3
Electrical engineers	209	.8	65.3
Computer programmers	205	.8	76.9
Maintenance repairers, general utility	193	.8	27.8
Helpers, trades	190	.7	31.2
Receptionists	189	.7	48.8
Electricians	173	.7	31.8
Physicians	163	.7	34.0
Clerical supervisors	162	.6	34.6

Table 7. Forty Occupations with Largest Job Growth 1982-95

(continued)

Occupation	Change in Total Employment (in thousands)	Percent of Job Growth	Percent Change
Computer operators	160	.6	75.8
Sales representatives, nontechnical	160	.6	27.4
Lawyers	159	.6	34.3
Stock clerks, stockroom and warehouse	156	.6	18.8
Typists	155	.6	15.7
Delivery and route workers	153	.6	19.2
Bookkeepers, hand	152	.6	15.9
Cooks, restaurants	149	.6	42.3
Bank tellers	142	.6	30.0
Cooks, short order, specialty and fast food	141	.6	32.2

Note: Includes only detailed occupations with 182 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

Table 8. Twenty Most Rapidly Declining Occupations 1982-95

Occupation	Percent decline in employment
Railroad conductors	-32.0
Shoemaking machine operatives	-30.2
Aircraft structure assemblers	-21.0
Central telephone office operators	-20.0
Taxi drivers	-18.0
Postal clerks	-17.9
private household workers	-16.9
Farm laborers	-15.9
College and university faculty	-15.0
Roustabouts	-14.4
Postmasters and mail superintendents	-13.8
Rotary drill operator helpers	-11.6
Graduate assistants	-11.2
Data entry operators	-10.6
Railroad brake operators	-9.8
Fallers and buckers	-8.7
Stenographers	-7.4
Farm owners and tenants	-7.3
Typesetters and compositors	-7.3
Butchers and meatcutters	-6.3

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

Table 9. Twenty Fastest Growing Occupations, 1982-95

Occupation	Percent growth in employment
Computer service technicians	96.8
Legal assistants	94.3
Computer systems analysts	85.3
Computer programmers	76.9
Computer operators	75.8
Office machine repairers	71.7
Physical therapy assistants	67.8
Electrical engineers	65.3
Civil engineering technicians	63.9
Peripheral EDP equipment operators	63.5
Insurance clerks, medical	62.2
Electrical and electronic technicians	60.7
Occupational therapists	59.8
Surveyor helpers	58.6
Credit clerks, banking and insurance	54.1
Physical therapists	53.6
Employment interviewers	52.5
Mechanical engineers	52.1
Mechanical engineering technicians	51.7
Compression and injection mold machine operators, plastics	50.3

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

Table 10. Employed According to Schooling Completed in 1980, and Forecast Through 1990

1980 Employed According to Schooling Completed
(in thousands)

	Agriculture	Industry	Services	Total
1. Elementary and Intermediate School	2,864	6,830	6,690	16,383
2. High School Diploma	75	806	2,245	3,126
3. College Degree	10	118	878	1,006
4. Total	2,948	7,753	9,814	20,515
2/4 High School Diploma Rate (%)	2.5	10,0	22,9	15,2
3/4 College Degree Rate (%)	0,3	1,4	8,9	4,9

1990 Employed According to Schooling Completed
(in thousands)

	Agriculture	Industry	Services	Total
1. Elementary and Intermediate School	2,086	6,400	7,685	16,171
2. High School Diploma	98	1,063	3,239	4,400
3. College Degree	13	165	1,227	1,405
4. Total	2,197	7,628	12,151	21,976
2/4 High School Diploma Rate (%)	4,5	13,9	26,7	20,6
3/4 College Degree Rate (%)	0,6	2,2	10,1	6,4

Source: 1980, Istat, work force findings, April 1980; 1990 Isri--Institute for Industrial Relations Studies.

Table 11. Services: Percent Employment Increase Between 1970 and 1980 and Percent Forecasts for 1980-90

Sectors	1980-90	1970-80
1. Finance & Insurance	60.0	69.7
2. Various services	30.5	31.2
3. Communications	20.0	37.5
4. Government employees (excluding teachers)	18.0	34.0
5. Commerce	17.8	14.8
6. Transportation	16.5	17.7
7. Hotels & Public Businesses	13.0	12.9
8. Auxiliary Transport Activities	10.0	9.8
9. Maritime & Air Transportation	0.8	0.9
10. Public School Teachers	0.0	51.5
11. Other Services (domestic etc.)	0.0	1.6
12. Total Services (1-11)	18.7	24.2
13. General Total of which:		
13a. Agriculture	-20.4	-23.4
13b. Industry	0.5	-1.4

Source: Istat: Economic Counts from 1970 to 1980;
Isri: Forecasts to 1990.

Table 12. Cross Occupational Employment Opportunities

Marginal Land Utilization Experts and Technicians	20,000
Soil Stabilization Experts and Technicians	20,000
Water Resources Experts and Technicians	20,000
Agricultural Techniques Experts and Technicians	300,000
Preschool Infant Assistants	150,000
Experts of Video Games and Other Leisure Computer Applications	50,000
Experts and Workers in Information Technologies	450,000
Bureaucratic Systems Experts and Technicians	300,000
Technicians and Experts on the Preservation of Arts and Culture	150,000
Total (approximate)	3,000,000

Source: Enea (without mention of method).

Table 13. New Professions of the 1990's

Activity	Job Offers USA	Italy
Energy Technicians	830,000	200,000
Rebuilding and Restauration	500,000	150,000
Environmental Technicians	300,000	100,000
Industrial Laser Technicians	600,000	50,000
Industrial Robot Technicians	800,000	200,000
Special Materials Technicians	400,000	200,000
Biotechnology Technicians	250,000	200,000
Nondestructive Controls Technicians	200,000	50,000
Bionic Technicians	200,000	50,000
Nuclear Medicine Technicians	700,000	25,000
Computerized Diagnostic Systems Technicians	210,000	50,000
Computer-Aided Design (CAD) Technicians and Computer-Aided Graphics (CAG) Technicians	300,000	100,000
Computer-Aided Manufacturing (CAM) Technicians	150,000	100,000
Computer Instruction Systems Technicians	300,000	50,000

Source: U. Colombo, "Where the careers of the 1990's are hiding," Il sole-24 Ore, Oct. 7, 1983 (recompilation)

Table 14. Distribution and Utilization of the Computer in the Italian School (1984)

Types of School	Distribution % of Total of Institutions
Technical institutes	37.5
Universities	30.6
High schools and others above intermediate	17.3
Intermediate schools	13.5
Elementary schools	2.6

Locations	Utilization %
Laboratory	30.7
Programming courses	23.8
Applicative execution programs	19.8
Interdisciplinary didactic activities	15.4
Clerical work	10.3

Source: Apple Computer Italia 1985

Table 15a. Periodic Evolution of University Enrollment from 1950 to 1976

Enrolled Students	1950-51	1960-61	1970-71	1975-76
Within a degree program	145,170	191,790	560,605	736,303
Outside a degree program	86,242	76,391	121,126	199,492
Total	231,412	268,181	681,731	935,795

Source: Istat, Education Statistics, 1983, n. 7, p. 105.

Table 15b. University Students In and Outside of Degree Programs from 1980 to Present

Years	In a Degree Program Total	Freshmen	Outside a Degree Program	Total In and Outside a Degree Program
		Absolute Data		
1980-81	764,043	244,071	283,831	1,047,874
1981-82	724,539	226,421	300,142	1,024,681
1982-83	717,368	228,760	304,914	1,022,282
1983-84	746,070	256,611	309,163	1,055,233
1984-85*	773,411	248,806	315,000	1,088,411
		Index Numbers (1980-81 = 100.0)		
1980-81	100.0	100.0	100.0	100.0
1981-82	94.8	92.8	105.7	97.8
1982-83	93.9	93.7	107.4	97.6
1983-84	97.6	105.1	108.9	100.7
1984-85*	101.2	101.9	111.0	103.9

*Temporary data for students in a degree program; estimated data for students outside a degree program. The data for freshmen refers only to enrolled students.

Table 16. Percent Distribution of the Resident Population 6 Years and Older by Grade

	Census	
	1971	1981*
College Graduates	1.8	2.7
High School Graduates	6.9	11.4
Intermediate School Completion	14.6	23.9
Elementary School Completion	44.3	40.8
Literate Without Diploma	27.2	18.2
Illiterate	5.2	3.0

*Data obtained by a sample equivalent to 20 percent of the population.

Table 17. Illiterate Plus Literate for Age Groups 15 Years and Older

Age Group	Estimated Number	Percent
15 years and ovver	About 7 Million	100.0
15-24 years	187,000	2.7
25-44 years	899,000	13.0
45-54 years	1,329,000	19.2
55 years and over	4,500,000	65.1

Source: Compilation of Prof. Speciale from Istat data.

Table 18. Education Completed by the Italian Population; Percent of Total Population

Census	College Graduation High School Graduation Intermediate Completion	Illiterate Literate Elementary School Completion	Mandatory Age Students
1961	15		85
1971	23		77
1981	38	42	20

* Sample of 2 percent.

Source: See table 17.

Table 19. Percentage of Distribution of the Population, in Three Age Groups, by Diploma Received

Population by Diploma	Age Groups 20-24 years	 25-44 years	 45-54 years
Illiterate plus literate	2.4	6.0	18.7
Elementary school completion	15.6	42.3	56.4
Intermediate school diploma	42.0	27.2	14.8
High school diploma	38.3	18.5	7.1
College	0.7	6.0	3.0
	100.0	100.0	100.0

Source: See table 17.

Table 20. Percentage Distribution of Schooling Completed of Unemployed "Seeking First Job" Out of Total Active Population

Unemployed Seeking First Job	Percent
Illiterate plus literate	6.5
Elementary school completion	27.5
Intermediate school completion	40.5
High school graduation	22.3
College graduation	3.2

Source: see preceeding table.

Table 21. Public Education Budget Trend (1980-1985)

Year	Public Education Budget in Billions of Lire (absolute value)	Number Cost of Living Index	Value in 1980 lire	Real % Increase or Decrease
1980	11,296	100.0	11.296,0	
1981	15,055	118.7	12,683.2	+12.28
1982	18,513	138.1	13,405.5	+5.69
1983	21,972	158.8	13,836.27	+3.21
1984	23,611	175.6	13,445.90	-2.82
1985	28,014	192.0	14,590.63	+8.51

Source: Annual budgets of Ministry of Public Education (elaboration).

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